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Rise in Industrial Production

SOME generally encouraging conclusions may be drawn from the July figure for the index of industrial production which has been issued by the Treasury. For July the seasonally-corrected index stands at 111-112 on the basis of 1954 as 100. At the beginning of the year the index was 107, and this indicates an expansion on a scale which has not been experienced in this country since 1954. There is no doubt that, in large part, the expansion has been in consumer goods, but it is now beginning to work through to the capital goods industries. From the point of view of the outlook for traffic on British Railways, there is still a great deal of room for improvement in some of the basic industries, such as steel and above all coal. Production of the former is only about 80 per cent. of capacity and output in July was very little above last year's rate. The position in that industry is unbalanced, for while the motor industry, which is working at a very high level, is still threatened by a shortage of sheet steel, the heavy end of the industry still reflects lower demands from shipyards, the Coal Board and British Railways, and the heavy engineering industry. In engineering generally, although there has been some improvement, the majority of undertakings are still working below capacity. In some quarters the view is held that production will show further expansion in the last months of the year and that capital goods sections will have a greater participation in the forward movement. A good deal may turn on political factors in the last quarter. It is encouraging that there is little indication of any need of Government action to hold in check the present upsurge in consumer demand. It would appear that the present high level of production is being based very largely on the surplus capacity that existed when it first got under way. The implications to British Railways of the present movement would be far more encouraging if the basic industries were as well placed as those providing consumer goods. There does not appear to be much hope for a resurgence in the demand for coal, stocks of which are still heavy.

Modernisation Planning in L.M. Region

THE speeding-up of modernisation in the London Midland Region of British Railways under the re-appraisal plan recently announced, including a concentration of effort on major works which can be completed quickly, has been foreshadowed by the establishment of a planning office. This will provide a common service for all departments in the development of comprehensive regional plans. The most important work mentioned in the re-appraisal plan is the acceleration, by one or two years, of the work of electrification on the main line from Euston to Birmingham, Crewe, Liverpool, and Manchester. Co-ordinating the schedules of the operating and engineeering departmental staffs to allow each the greatest possible freedom and yet avoid interference with the work of others, requires exceptional tact and understanding of the problems involved. As recorded briefly in our August 28 issue, this task has been entrusted to Mr. W. O. Reynolds, who is in charge of the new planning office. Mr. Reynolds formerly was Assistant Operating Officer, Euston. Previously his work covered passenger and freight operations in many parts of the country. An illustrated biography appears elsewhere in this issue.

L.M. Region Provisional Timetables

MANY months will pass before the public enjoys the improved services resulting from electrification of British Railways, London Midland Region, main lines from Euston to Birmingham, Liverpool, and Manchester. Meanwhile it is important that goodwill be not lost through unpunctuality. Engineering works in connection with probably the biggest railway electrification ever undertaken necessitate adjustments in passenger timings. Some were incorporated in the 1958-59 winter and the current summer tables. Better timekeeping is reported as a result. Provision also will be made in the forthcoming winter timetable. This, like the other Regional timetables, would normally come into force next Monday, but because of production delays caused by the printing strike cannot take effect before November 2. From September 14 until then a temporary timetable will operate, in which it has not been possible to provide for all effects of engineering work. Passengers are warned that this "may sometimes result in trains taking some minutes longer" than shown in the timetables. It is hoped that late running will be confined to this modest scale. The main provisions of the interim timetable are the customary withdrawals of seasonal expresses such as the day "Irish Mails" between Euston and Holyhead in connection with the summer service day sailings to and from Dun Laoghaire.

New Approach Needed to Road-Rail Problem

THE need, in seeking an efficient and economical transport system, to study the cost to the community of each form of transport and to use them in combination, is stressed by Sir Reginald Wilson, Member of the British Transport Commission and Chairman of the Eastern Area Board, in his paper "Economics of Transport." This closely-argued treatise was presented last Tuesday to the British Association for the Advancement of Science at its annual meeting at York. Space allows only brief mention this week. The economics of the "carrying" and the "track" elements in transport, he states, must be considered separately. Neither unrestricted competition nor wholesale nationalisation is a solution. The present social urge is away from the cheapest pattern of transport, towards the private motorcar and the "C"-licence vehicle, but the social benefits must be assessed of preserving

a due measure of public transport. In many parts of Britain it would be physically impossible for traffic to move unless carried collectively. The new roads will be used free of extra cost by road carriers, whereas the cost of improved railway facilities falls directly on the railways. But the assessment of the proper relative charge for track to road and to rail is a hard problem.

Overseas Railway Traffics

PARAGUAY Central Railway receipts for the year ended June 30, 1959, amounted to G94,890,006 compared with G91,708,544 in 1957-58, an increase of G3,181,462. Receipts for the first two months of the new financial year have been poor in comparison with the previous year; at August 24, aggregate receipts showed a decrease of G1,443,995 compared with the corresponding period last year. Operating revenues of the Canadian National Railways for the month of July, 1959, amounted to $63,076,000. Expenses, taxes, and rents totalled $62,661,000, resulting in a net operating income of $415,000. In July, 1958, operating revenues were $62,770,000; expenses, taxes, and rents were $60,041,000 and the net operating income was $2,729,000. Canadian Pacific Railway revenue for July amounted to $40,867,948 compared with $39,426,410 in July, 1958. Railway expenses were $38,128,732 ($36,541,036) resulting in net earnings of $2,739,216 ($2,885,374). Aggregate net earnings for the seven months January-July, 1959, were $19,745,696 compared with $18,901,521 in the corresponding period of 1958. Net railway earnings of the West of India Portuguese Guaranteed Railway Co. Ltd. have showed considerable improvement in comparison with the earlier part of the year. The improvement is attributable to all classes of traffic.

Reconstruction of Wapping Station, L.T.E.

THE portion above ground of Wapping Station, on the East London Line of London Transport, is to be reconstructed. The station is at the north end of the Thames Tunnel, built in 1825-43 by Sir Marc Isambard Brunel, with his son, Isambard Kingdom Brunel, later Engineer to the Great Western Railway as Resident Engineer. The tunnel was intended for road traffic, but the inclined access roads were never built, and it served as a pedestrian subway, reached by stairs, until taken over by the East London Railway in 1865. Electric operation of passenger trains, of the then Metropolitan Railway, began in 1913. Access to the two platforms is by lifts in a wide circular shaft separating the Thames Tunnel from that through which the line continues northwards under the Eastern Dock of London Docks. The lifts are built on a framework within the shaft. Reconstruction will include restoration of the lift machine room and war-damaged lift house and replacement of a kiosk by new station premises with a central entrance. The remainder of the shaft, which serves as a vent for smoke from the steam-hauled goods trains on the East London Line, will be roofed with concrete. Louvres on the periphery, set in from the line of the original shaft wall, will allow smoke to disperse.

Electric All the Way

ONE result of the first stage of the Southern Region Kent Coast electrification has been that a traveller from Victoria to the Continent by the 10 a.m. service can make the rail journey to Rome in electric trains throughout. The 10 a.m. has been a regular multiple-unit boat train working, using the motor battery vans for conveying registered luggage, and connects *via* Dover-Ostend with the 4.45 p.m. from Ostend with sleeping car to Milan and couchettes to Rome. An unusual feature of the journey to Italy by this route is the variety of electrification systems traversed. Beginning with 750V. d.c. from London to Dover, the sequence of systems continues with 3,000V. d.c. from Ostend to Luxembourg, 25kV. 50-cycle a.c. from Luxembourg to Basle (using the Luxembourg-Metz connection described in our April 12, 1957, issue), 15kV., 16 2/3-cycle a.c. from Basle to Chiasso, and 3,000V. d.c. in Italy. Bo-Bo locomotives of the Belgian National Railways "123" class with regenerative braking for use on the Luxembourg line run through between Ostend and Luxembourg on these trains. Dover and Ostend are the first pair of Channel ports with electrified services, although it may be recalled that on this side of the Channel the Victoria-Newhaven trains have been worked by electric locomotives (with some multiple-unit reliefs) since April 15, 1949, while electric expresses in connection with boat sailings can be dated back to the electrified Waterloo-Portsmouth-Isle of Wight multiple-unit services of July 4, 1937.

Peak Passenger Travel in France

THE extreme variation between peak and off-peak main-line passenger traffics on the French National Railways is pointed out by Monsieur J. Marteau, Ingénieur Principal in the Operating Department at all-line headquarters, in an article in a recent issue of the *British Transport Review*. At the Paris Montparnasse terminus of the Western Region, which deals with trains to and from the coastal resorts of Brittany and the Bay of Biscay, passenger departures on the busiest day of 1958, August 4, were 14.8 times those of the least busy, February 22. In general, peak traffic at Paris termini is about three times the average for the year. Steps taken to even out the traffic include approaches to the Government which have resulted in advancement of the commencement of school holidays from July 14 to July 1; and a joint meeting every year under a chairman designated by the Ministry of Labour, attended by representatives of trade unions and employers' associations, to discuss the dates of holiday closing of industrial plants, which has resulted in some easing of the burden on the railways. The offers of reduced fares also are carefully controlled as to dates.

Measures to Economise in Rolling Stock

FAILURE to take up seat reservations has been reduced on the S.N.C.F. by charging, as an experimental measure, an advance deposit for each seat reserved by ordinary parties. This is repaid only when reservations are cancelled in good time. Centralisation of seat reservation diagrams helps to avoid wastage of seats. Measures to regulate user of rolling stock include all-line stock control. Operation in 1958 of pilgrimage traffic to Lourdes was aided by the use of identical 10-coach sets which could be used in ordinary traffic. The S.N.C.F. passenger vehicle fleet, including railcars, last year was nearly 49 per cent of the 1939 figure, but the number of passenger-km. per vehicle rose in 20 years by 181 per cent to 1,940,000. Despite increasing traffic, it has been possible to reduce the number of relief trains. Even so, wooden-bodied bogie stock and even six- and four-wheel vehicles have had to be used at busy times.

Proposed Hose-coupling Standard

A COMMITTEE has been formed and work has been started by the British Standards Institution on a proposed standard for hose-couplings for railway rolling stock. The committee comprises representatives from British Railways; the Crown Agents for Oversea Governments & Administrations; the smaller users, such as operators of industrial plants, and the principal British manufacturers of this equipment. The scope of the standard will include coupling-heads and nipples for air and vacuum brakes, for steam-heating between locomotives and rolling stock, and for use between individual rolling stock units. Work on standardisation of the flexible hoses for the above was already in hand by another sub-committee, which was unable to proceed until the dimensions of the coupling-heads, nipples and clamps had been settled. Completion of the work on these details will allow the flexible hoses to be standardised, and enable the whole hose-coupling assembly, as normally carried in stock, to conform to British Standards. In preparing this new standard the committee is taking into consideration the work already done by the International Union of Railways, U.I.C.

Replacing Level Crossings in India

BECAUSE of the present rapid increase in the volume and frequency of rail and in some areas of road traffic also in India, the replacement of level crossings by road over- or under-bridges is becoming a serious problem. The railways do not usually consider such replacements unless specifically requested to do so by the highway authority, which is generally the local

or State Government. A recent directive by the Government of India advises the State Governments to prepare comprehensive programmes for such replacements and, with the approval of the Planning Commission, to include them in order of priority in their budgetary provisions from the loans they receive from the Central Government for their development schemes. Proposals with the provision of funds are therefore being or have been prepared by the local authorities to cover the remaining two years of the Second, and the whole of the Third, Five-year Plan period. These are notified to the Railway Board to enable a co-ordinated programme of crossing replacements to be framed for the whole country, with due consideration for priorities.

Electrical Exhibition in Paris

THE " Electrama " exhibition held recently in Paris featured the products of many hundreds of firms in the electrical industries, including electric locomotives, rolling stock, and signalling apparatus. It was supported by consulting engineers and by many associations and public bodies. Every aspect of electrical engineering was covered. The French National Railways were represented by a variety of rolling stock and equipment. The development of 25,000-V. a.c. 50-cycle traction alone was shown in an extensive display, as were the improvements realised since the war in signalling and telecommunications and the protection of equipment against external influence, felt more particularly with the new high voltage traction. Relay interlocking, with signals, point machines, remote coded control and block circuits and so on, electronic and other types of track circuiting, with other devices, attracted much attention. This served to impress on the public the attention being given to the problem of combining safety with expeditious traffic operation.

City of the Future

IN a recent issue of the American magazine, *This Week*, Colonel S. H. Bingham, consulting engineer, and former Chairman of Transportation & Manager of the Transit Authority, New York City, described his " dream of a futuristic city, built specially for high-speed cars, jets and rockets." It would be convenient, quiet, traffic-free and even weather-controlled. To eliminate private cars from the city centre, they would be parked on the outskirts, in box-like containers and stored automatically in huge garages. An overhead monorail service would go below ground through the city centre. Non-stop driverless " carveyors," similar, we imagine, to those at the Wembley Exhibition of 1924-25, would run on a circular track. These would slow to walking pace at platforms. Colonel Bingham envisages a weatherproof dome encasing the city centre. In residential areas weather control, rather than weatherproofing, would be satisfactory. Cooled or warmed air would be piped from a central air-conditioning unit. Pavements would be kept clear of snow and ice by radiant heat. Everything in the article either exists or could be constructed. Colonel Bingham states that the city of tomorrow could be built today.

Swiss Transport Museum Opened

THE opening in July at Lucerne of the Swiss Transport Museum—though the word museum does not form part of its official title—completes the implementation of a proposal first made in 1897, when the jubilee of railways in Switzerland was celebrated. In 1914 some items of historical railway interest were shown at the National Exhibition and later kept either in part of a Zurich goods station or in various places about the country. This Zurich collection remained very little known until 1937, when a general transport museum was proposed, a suggestion strongly supported after the National Exhibition of 1939. In 1942 an association was formed with this object, supported by the Federal Railways, certain private lines, other transport undertakings, and interested bodies. It proved impracticable to establish the museum in Zurich, as originally intended. Eventually, the city of Lucerne offered a good site in a convenient position. Funds were provided by the Federal Assembly, the railways, postal authorities, the road transport association and other undertakings, and work was begun. The many railway exhibits include locomotives and rolling stock and one-tenth scale models.

New Railway in Texas

THE first railway to be opened in the south-west of the U.S.A. for nearly half a-century is in the new Great South-west RR., which serves the Great South-west Industrial District & Distribution Centre, midway between Dallas and Fort Worth. It extends from a junction with the Texas & Pacific Railroad, on the south-western border of the estate, to one with the Rock Island, on the north side. Connection is also made with eight other railways. With spurs to different works, the new main line is 10 miles long with a 4½-mile branch to connect with the Rock Island line; an additional 6½ miles is planned at a later date. The traffic expected after five years' development is 25,000 wagonloads in and out of the industrial districts, with a further increase in due course. Eight bridges were needed. In the larger of them the construction is of pre-cast and pre-stressed concrete beams, a type of construction new in the U.S.A. Three of these bridges, spanning arterial roads, are of 413- 360- and 230-ft. span, respectively.

The Vital Rôle of British Railways

THE ability of British railways after modernisation and re-equipment, given conditions of reasonable stability, to play their essential rôle in the national economy, to compete with developing road transport and to lead the world as they did as pioneers in the last century is emphasised by Sir Philip Warter, Member of the British Transport Commission and Chairman of the Southern Area Board. In an article in the August issue of the *National Bank Review* he points out that life in Britain would be " difficult, if not impossible " without railways, which *inter alia* operate over 18,000 million ton-miles of goods a year and convey about 1,500,000 people into and out of the principal cities during the morning and evening traffic peaks—including 850,000 moved to and from London termini daily throughout the year, in all weathers, by the Southern Region, and carry many thousands of holidaymakers to and from summer resorts. The Government has categorically stated that railways are essential, and is providing funds for modernisation and re-equipment accordingly.

He gives a short account of the inability of the former railway companies to find capital for adequate re-equipment or even replacements before the last war, during which plant and equipment were inevitably overworked. The development of movement by road, especially of freight, is admitted as inevitable. As the modernised railways come more fully into their principal rôle in transport business of the nation, their position in relation to road hauliers is bound to be keenly debated. Sir Philip Warter points out that " just as no industrial country today can exist without its railways, neither can it exist without its roads."

A great many biased people (" die-hard protagonists "), will continue to air the popular but fallacious view that expenditure on railway modernisation is far greater than that spent on new roads. The real position, he states, is exactly the opposite. In 1958 the roads took about five times more capital investment than the railways—some £730 million on the roads against £145 million on the railways. This disparity in favour of roads, he believes, is likely to be even larger in the years ahead. " But it is not a case of railway or roads," he adds. " Both are vital, both have traffics and tasks they are best suited to move and carry out, and both, in more equitable conditions than have previously existed, will have much to gain from a healthy competition."

Discussing the advantages of railways as freight carriers, he stresses the cheapness and ease of bulk movement, in which nearly 1,000 tons can be handled by a train crew of only three, and the fast-developing techniques of door-to-door movement by container and other means. As to the closing of branch lines, he emphasises the statutory obligation on the British Transport Commission to make its undertakings pay, and stresses that if an uneconomic branch service cannot be made remunerative its withdrawal is the only answer. " It is difficult," he states " to make transport users face realistically the fact that to have an up-to-date transport system involves parting with the dead limbs that clearly batten parasitically on the system." The common level of fares does not bring home to the branch-line traveller, sitting in solitary comfort in his compartment but paying no more per mile for his journey

than any of the 500 or 600 passengers in a main-line express, the excessively high cost of carrying him." The Commission, he maintains, cannot ignore this drain on its resources, and it is inevitable, as envisaged in the modernisation plan, that there should be " a marked reduction in the stopping and branch-line services which are little used by the public and which, on any dispassionate review of the situation, should be largely handed over to road transport."

Among developments in progress to increase the speed and efficiency of movement over main lines, Sir Philip Warter mentions the installation of automatic warning control on the Kings Cross to Edinburgh, Euston to Glasgow (and Liverpool and Manchester), Edinburgh to Glasgow, Waterloo to Bournemouth and Exeter, and Liverpool Street to Norwich lines by 1962. He outlines clearly the problem of replacing steam by electric and diesel traction and mentions what is being done, including good progress on electrification of the Southern Region Kent coast lines at 750 V., a.c. electrification in other Regions, steps to increase the capacity of the Southern Region London electric suburban services by lengthening trains, and the increase in traffic after introduction of diesel services in Hampshire and elsewhere. He believes that railway users accept the inconveniences inevitable during the transition, provided that they are frankly explained, though " we must set a limit to the amount of disruption that can be tolerated, even supposing that the electrical industry in this country could meet a vastly stepped-up demand for the mass of equipment required for electrification projects. So diesel traction, easy to install and offering many of the advantages of electricity . . . is developing side by side with electric traction."

As to passenger fares, he points out that the widespread impression that they have risen since before the last war to " iniquitous " levels has no basis in fact and reflects the instinctive dislike of paying more for transport, when much greater increases are accepted in the prices of food, tobacco, and so on. The real position is that on average rail fares are about double pre-war while other prices are about three times. " A typical wage-earner is able to earn the price of a railway journey in much shorter time today than was the case before the war." He explains that the maximum fares on the B.T.C. Passenger Charges Scheme, recently approved, are only headroom within which fares may be " sensitively and properly adjusted " to reflect the cost and quality of services and the facts of competition.

Goods traffic, he believes, is already reflecting the benefits of modernisation. Over one-third of total rail freight mileage is run today at express speeds and over 800 overnight express goods trains are running to a strict timetable and giving an assured next-day arrival. The new flexibility in rate-fixing is being increasingly used to develop better and faster freight services. " In the mounting drive for railway freight there is clear evidence that our rates, tailor-made to the traffic for the first time in the history of British Railways, are highly competitive."

London Transport in 1958

DESPITE the aggravation of traffic congestion in London, and the London Transport bus strike of May 5-June 20 with the consequent loss of revenue and bus traffic, 1958 was a year of technical progress on the London Transport Executive Underground and road services. This is made clear in the annual review " London Transport in 1958," which we received last week. The publication is intended primarily for the senior staff of London Transport Executive in the several parts of the undertaking. It is clearly written and well produced. From this year the review is offered for sale to the public. At 2s. 6d. the 80-page booklet is good value. It is dated June 1, and is signed by Sir John Elliot, who retired from the chairmanship of L.T.E. on June 30. Publication was delayed by the strike, but it is late to consider the events of over a year ago, despite the permanent relevance of some matters.

In his foreword Sir John Elliot points out that 1958 was a most difficult year for London Transport. The total number of motor vehicles on the road increased and traffic congestion got worse. " It became clearer than ever " he adds " that freedom of movement on the streets was (and is) in jeopardy. It also became clear that more people are travelling on the Underground and this is a further compelling reason for starting to build the Victoria Line without further delay." Mr. A. B. B. Valentine, who has succeeded Sir John Elliot as Chairman of L.T.E., has called for the co-operation of the public in helping to mitigate street congestion.

Private motorcar traffic in central London increased in the two years ending July, 1958, by 9 per cent, and the number of vehicles licensed in the London Transport area increased by 17 per cent to 1,050,000. The smaller increase in traffic, the review comments, may suggest that the streets are now becoming saturated. Street congestion is stated to have an increasingly serious effect on the regularity of bus services in the central area. Congestion in the weeks immediately before Christmas, 1958, when movement was brought almost to a standstill for long periods, was the worst ever encountered. This, it is stated, " is a warning of what must soon be everyday experience unless prompt and effective measures are taken, for London is slowly but surely throttling itself." Implementation of plans to increase and extend station car parks on the Underground, the review maintains, are helping to ease street traffic congestion.

Largely because of the seven-week bus strike, and of the wet summer, road services carried 20 per cent fewer passengers in 1958 than in 1957. The Underground on the other hand carried nearly 4 per cent more. Describing the Underground and the suburban lines of British Railways as " indispensable to the daily life of London," the review makes a strong plea for the proposed Victoria Line tube. If construction is not begun soon, conditions on some Underground lines may become intolerable in peak hours. The London Travel Committee recently recommended to Mr. Harold Watkinson, Minister of Transport & Civil Aviation, that the line be built " as a useful addition to London's transport facilities in any circumstances " and the review expresses London Transport's hope that the money for its construction at an early date will be found.

The serious effect of last year's bus strike on London Transport's road passenger traffic and finances, is dealt with at length. When services were resumed, the number coming by bus to work in central London dropped by one-fifth and even now has only recovered to about 8 per cent below the total before the strike. The review emphasises that the strike confirmed the superior efficiency of the bus as a bulk carrier. The dispute cost London Transport a net loss of over £2,000,000 for the seven weeks. The net revenue for the year despite all possible economies amounted to only £1,800,000. This was £4,200,000 short of the £6,000,000 annual contribution of L.T.E. to the British Transport Commission central charges. It was the smallest contribution since 1951 and equivalent to only one per cent on capital employed.

During the year L.T.E. was spending over £30,000,000 on improving the Underground, including electrification and widening of the outer section of the Metropolitan Line; replacement of rolling stock on the Metropolitan, Piccadilly, and Central Lines; complete segregation of London Transport and Eastern Region lines on the eastern section of the District Line; and modernisation of the electrical current distribution system. These developments have been described in our pages. The £10,000,000 scheme to replace trolleybuses by diesel buses had started and advantage was being taken of the flexibility of the diesel bus to integrate services and provide new direct links. Prototypes of the new 64-seater Routemaster buses, which will replace most of the trolleybuses, successfully completed their service trials.

Train service and other adjustments were made on the Underground during the year. From June, 1958, the Holborn-Aldwych branch service was restricted to peak hours and the Acton Town-South Acton branch (subsequently closed entirely) was closed on Sundays. From October, six stations were closed on Sundays. Operation of junctions by programme machines, described in this journal, and first effected at Kennington on the Northern Line in January, 1958, was extended later in the year to other locations. A new mechanism for the locking of points has been developed from a design recently evolved by the French National Railways. The closed tongue of each switch is firmly clamped to its own stock rail by a hook clamp, and locking rods are dispensed with. Separate electric contacts for each switch ensure that the points are properly in position before the signal protecting the points can be cleared. Tests with prototypes proved successful, and the new design has now been adopted as standard.

At Greenwich generating station one of the three 20,000-kW. turbo-alternators hitherto supplying the trolleybus system has been converted from 25-cycle to 50-cycle operation to feed the Underground. Reference is made in the report to Notting Hill Gate Station where the new sub-surface ticket hall to serve both the Central and Metropolitan Lines, part of which was opened in August 1958, was brought into use in March, 1959, with two flights of escalators. A new bay platform for London Transport trains was completed at Kensington Olympia and the tracks segregated and re-signalled, so that Underground trains can work to and from Olympia independently of Western Region trains. After 90 years in service, a 120-yd. length of brick tunnel on the Metropolitan Line south of Swiss Cottage was replaced by one of concrete.

A more competitive outlook among suppliers, with some lowering of basic prices, resulted in purchases being made in 1958 at slightly lower prices than in 1957. In accordance with B.T.C. policy efforts to widen the field of purchase for contracts of supplies and equipment were pursued. This policy had always been followed by L.T.E., and further progress was made, particularly in the case of railway rolling stock, where extensive orders have been placed. Replacement of the Piccadilly Line stock was deferred in 1952 for economy reasons. The rolling stock replacement programmes for the Piccadilly, Metropolitan, and Central Lines must therefore proceed, mainly in sequence, within a relatively few years. This enabled the programmes, which together comprise some 1,130 vehicles, to be planned to provide continuous production runs for items such as traction motors, traction control equipment, door gear, brake components, and couplers, where they are of common or similar design for all three types of stock. That equipment accounts for some 40 per cent of the purchase price of the trains. Tenders could be sought from a wide field and contracts placed for the whole of the requirements of the equipment for the three programmes of stock. The economies and increased efficiency of manufacture achieved from long and steady production were reflected in the prices at which the contracts were let.

The many subjects of research included de-icing of conductor rails. Minimum-registering thermometers were installed at 39 points on open sections of track and the information derived from records of rail temperatures will enable more economical use to be made of de-icing fluids in winter. Strain gauges and electronic equipment have been used to measure stress loadings in Underground stock. Investigation into the passenger capacity of footways proved to be of considerable interest to transport undertakings abroad. Other research work included investigations into the seating layout in Underground cars and the illumination of escalators. The passenger-carrying capacity of a particular tube line has been the subject of preliminary studies, which are being continued and extended. The potentialities of electronic data processing also have been studied. The examination is now being concentrated on particular subjects, and three working parties have been formed to make "feasibility studies" in the auditing of and accounting for traffic receipts and the preparation of allied statistics, which are being studied for road and rail services separately, and the compilation of time schedules for bus services.

Railways in the Pakistan Five-Year Plan

ONE-SIXTH of the total outlay of the Pakistan First Five-Year Plan, 1955-60, is earmarked for development of transport and telecommunications. Some account of expenditure to-date was given recently by Mr. E. A. Khan, of the Planning Commission. Some Rs.1,120 million (£86 million) has been spent on development of transport and communications in the first four years of the plan and an estimated Rs.580 million will have been spent by the end of the period June 30, 1960.

The entire communications system of Pakistan was disrupted by Partition in 1947 and immediate steps had to be taken to overcome the difficulties. The capacity of Karachi and Chittagong ports was considerably increased and a new port, Chalna, developed in East Pakistan. Large amounts were spent on the rehabilitation of the railways also. By the year 1955 a total of Rs.500 million was spent on this account. Until 1955 the main concern was the rehabilitation of the rolling stock. From then onwards the emphasis shifted to the improvement of the track, for which Rs.250 million were allocated. During the first four years that the plan has been in operation, 650 miles of rails and wooden sleepers on 1,100 miles of track have been replaced. The plan envisaged the import of 98 new locomotives, 450 passenger and 7,250 goods vehicles at a total cost of Rs.310 million. So far 104 locomotives, 330 coaches and 4,100 goods wagons have been ordered at a total cost of Rs.290 million. The plan provides extension of bridges and other development work.

Perhaps the most notable feature of development of the Pakistan railways is the introduction of diesel traction. Developments in this field, and notably on the North Western Railway, have been described from time to time in this journal. A great deal has been done to improve signalling. Although the economic situation of Pakistan has not on the whole favoured new railway construction, new lines have been built on the N.W.R. Meanwhile heavy expenditure has to be faced on the many bridges in both North Western Pakistan and Eastern Bengal, including renewal of the Lansdowne Bridge over the Indus at Sukkur.

The American Railroad Position

(*By a correspondent*)

IN the first six months of this year, the U.S.A. railroads retrieved much of the freight traffic lost during the 1958 industrial recession. Wagon loadings in 27 weeks to July 4 rose above last year's level by 2,062,280, or 13 per cent, to 16,726,840. A record quantity of grain for the time of the year was moved in 1,423,420 wagons, exceeding 1958 forwardings by 36,020, or 2.6 per cent. Coal output was 6 per cent higher and inland consumption expanded at the same rate. The tonnage of coal dumped at Lake Erie ports was up 30 per cent, but overseas export coal was down 33 per cent. The outcome of these changes was an increase of 242,500 in the number of wagons filled with coal and coke to a total of 3,145,530. That was an advance of 8 per cent on 1958, but a decrease of 17 per cent from 1957.

Shipments of ore at Lake Superior docks doubled during the half year, while the tonnage of imported ore through ocean ports increased by nearly one-third to 7,153,000 tons. The railroads hauled 1,086,530 wagons of ore, 431,200 more than in 1958, a rise of 66 per cent. Perhaps the most satisfactory change, however, was the increase of 1,211,120, or 16 per cent, in wagon loads of general merchandise, which brought forwardings of high-rated traffic to 8,780,370 loads, about 52 per cent of the aggregate. On an average a wagon of merchandise may earn $370 compared with receipts of about $215 from a wagon of coal and $145 from a load of iron ore, although the heavy traffics will cost less to handle.

The railroads keep a tight hold on the carriage of merchandise in wagon loads averaging about 30 tons, but are steadily losing the conveyance of small lots of less than 5 tons. In 1948 "smalls" occupied 5,457,080 wagons, 13 per cent of all loadings. In 1958 the number fell by 57 per cent to 2,333,150, about one per cent of total loadings. Over 27 weeks of this year the number of wagons was 83,470, or nearly 7 per cent below 1958 and 341,390, or 23 per cent below 1957. At that rate it cannot be long before the railroads become entirely carriers of traffic in full wagon loads. The growing movement of road trailers on railway flat wagons may be noted as a means to that end. To July 4 such loadings totalled 208,580, compared with 128,410 in 1958, an increase of 62 per cent.

For the first half of 1959, operating revenues totalled $5,026 million, an increase of $491 million on 1958, or 10.8 per cent, while operating expenses were $3,904 million, a rise of $178 million, or 4.7 per cent. On June 30, the operating ratio stood at 78 per cent against 82 a year ago. Earnings before charges amounted to $414 million, an increase of $180 million on 1958, but $37 million below 1957 earnings. Net income (earnings after charges) was estimated at $308 million, against $127 million in 1958, and $346 million in 1957.

The first half of 1959 was thus a time of substantial progress. Soon the railroads might have been able to resume capital expenditures for improving their properties on a liberal scale. Unhappily the reckless steel strike, which began in July, will give a serious setback to the efforts of the railroads to regain the status they had as freight carriers in 1956.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of Correspondents)

Southern Region Diesel-Electric Services

September 7

SIR,—We have to confess that for the moment we have more than enough on our hands in eliminating steam traction as quickly as possible from the eastern part of the region.

As soon as we get a bit of breathing space we shall turn our attention westwards eagerly. At present we can only explore possibilities and do some hard thinking; and among the things we have already thought about is the possible use of diesel-electrics in the way suggested by Mr. G. A. Allan in your issue of August 28.

Yours faithfully,

F. D. Y. FAULKNER
Public Relations Officer.

British Railways, Southern Region, Waterloo Station, S.E.1

Widening of L.T.E. Metropolitan Line

September 2

SIR,—I used to live on Moor Park and am house hunting in the Aylesbury district now. British Railways, London Midland Region, informs me that it cannot "make any radical improvements in the schedules as between Aylesbury and Marylebone" until the widening and associated works between Harrow and Amersham are completed "late in 1962." What that Region's Public Relations Department leaflet does not say is that a very large part of the civil engineering work was done before the work was suspended during the last war. The steel girders have been lying on site since then and when I was over the line a few weeks ago there was no civil engineering work in progress apart from Amersham. The trains are painfully slow.

Compare the recently completed St. Lawrence Seaway. That project was bigger than either the Suez or the Panama Canals. Yet it was put through in four years. The British Transport Commission complacently expects to take three more years to complete a half-done job which has lain unfinished for nearly 20 years. The Seaway engineers carried on in summer with the traffic passing and in winter with temperatures far below anything known here since the Ice Age. They lifted whole bridges without interrupting traffic. They switched the St. Lawrence from one side of its bed to the other without interrupting its flow. And so on.

What is to hinder the relatively small Metropolitan Line job from being polished off by next Spring? London Transport Executive must jump to it. Ashfield and Pick would be ashamed!

Yours faithfully,

W. LOCH KIDSTON

6, Chester Street, Edinburgh, 3

Withdrawals of Passenger Services

July 24

SIR,—Now that the British Transport Commission has decided to try to get out of the red as rapidly as possible by closing 1,800 route-miles and hundreds of small railway stations on main lines during the next four years (instead of only 300 route-miles as in the last four), a revision of its procedure for arranging alternative bus facilities has become urgent. All that happens at the moment is that the posters announcing the closure of a station or of a section of line just include the phrase: "The . . . bus company operates services in the district"; sometimes they do not even include that.

The original provincial bus networks were laid out in competition with the railways instead of as feeders; consequently bus stations are often very far away from railway stations and the times of buses bear no relation to the arrivals and departures of trains at the nearest railway station remaining open. But even when they do connect nicely, how are travellers from a different part of the country to know this if bus timetables are never published outside the restricted areas which they serve?

The time has come when the B.T.C. should follow the procedure standard in all Continental countries and followed by at least one of the pre-war British railway companies when closing unremunerative stations or sections of lines: (1) make sure that the withdrawn railway facilities are adequately replaced by bus services connecting with main line trains at the nearest or most convenient railway station remaining open; (2) publish the timetables of these substitute bus services in the railway timetable; and (3) continue the issue of through tickets and parcels and luggage facilities via these substitute bus services. As the Commission owns the great majority of provincial bus undertakings it ought to be easy enough to arrange this. All it needs is a little co-ordination between different departments of the same organisation, and a little more imaginative consideration for the public.

Consideration for the public ought to be the main impetus in procedures of this sort. Unfortunately it does not seem to rank high among the B.T.C. priorities, least of all with those departments responsible for publishing timetables. There are two more advantages that would flow from this procedure for the B.T.C.: (1) There would probably be much less public opposition to the closing of unremunerative stations and branches if bus services in the area were made to offer the same or better main-line connections and other services which the withdrawn railway facilities had hitherto provided; (2) the traffic fed by the branch line or small station to main-line services would not decline, nor would the amount of passenger traffic coming into the area by rail from other parts of the country; and (3) the Commission would gain in public goodwill, which is vitally important at a time when the railways are fighting for freight traffic against the C-licence vehicle, and about to ask Parliament to relieve them of some of their capital charges.

Yours faithfully,

F. E. LAMOND

29 Oakwood Road, Bricket Wood, St. Albans

The Former G.C.R. Main Line

September 2

SIR,—It is proposed to reduce the service over the former Great Central Railway main line between Marylebone and Nottingham to semi-fast trains only. The Kings Cross to Sheffield route of the former is to be electrified to Retford with, probably, faster and more frequent trains, and will take the cream of the through traffic.

The former Midland Railway route from St. Pancras and the G.C.R. main line are left competing for the rest of the through and intermediate traffic. The Marylebone route passes through Leicester and Nottingham with the valuable connection at Banbury with the Western Region. The St. Pancras line is more easily graded between London and Leicester and traverses more potential sources of traffic.

The advantages of both routes could be combined by building connections: (a) to enable trains from the (Midland) Leicester London Road Station to run to the (G.C.) Nottingham Victoria, with a new station at Loughborough where the routes cross, to replace both the existing Loughborough passenger stations; (b) south of Leicester, to give trains from the (G.C.) Rugby Central and G.C. main line access to Leicester London Road, which would make possible closure of Leicester Central, where traffic is likely to decline; (c) north of Nottingham Victoria, to enable trains from that station to run to Sheffield Midland, this spur to be near Sheepbridge, perhaps, and enable the Nottingham-Sheffield trains to serve Chesterfield Central, which is better situated than the Midland station there.

These lines would facilitate a frequent service of fast trains from St. Pancras, with possibilities of good intermediate traffic. Passenger traffic would be concentrated at one station in several towns. South of Leicester, most trains would run to St. Pancras, and others to Marylebone via Aylesbury and perhaps also via Banbury, Bicester and High Wycombe.

Yours faithfully,

D. J. MANTON

Cotswold, Evelyn Way, Stoke d'Abernon, Surrey

THE SCRAP HEAP

With Good Intentions

Application received by the Port Firemaster, East African Railways & Harbours :

"I am interested in Fire Brigades and shall be pleased if you will accept me as a fire extinguisher."—*From the "East African Railways & Harbours Magazine."*

Faster by Train

It has been there for a month or two but I noticed on my way back from the Royal Show, this notice, fixed to a wall where the worst part of the normal traffic jam forms in High Wycombe: "You could have been there long ago by train."—*"Peterborough" in "The Daily Telegraph."*

Buffet Cellar Competition

The French National Railways recently organised a competition between buffets on stations outside Paris to determine the best stocked and kept wine cellars. Buffets in the Paris area were excluded because of the difficulty of making an equitable comparison between these and provincial station buffets. The sole consideration in judging the cellars was not the size or the wide variety stocked; equal importance was attached to the degree of consideration given to the particular tastes of customers. The winning buffets were located at Poitiers, Havre, Toulon, Mulhouse, La Rochelle, Chalons-sur-Marne, Metz, Roche-sur-Yon, Strasbourg, and Nantes.

Midland Railway Locomotive Restored

A locomotive built in 1902 and retired in 1951 having done some 1,750,000 miles, has been completely restored to its former glory to earn money for British Railways. It is the first "Compound" locomotive of the former Midland Railway and was numbered 2,631 when built. It was renumbered 1,000 in 1907 and rebuilt in present form, incorporating superheating, in 1914. It is to be employed on special trains, principally for locomotive enthusiasts, when they wish to arrange tours of railway installations. Its first venture was on August 30, when it took a train of 350 members of the Midland Area of the Stephenson Locomotive Society from Birmingham New Street to Doncaster and York.

The restoration of the locomotive has required considerable research by Mr. J. H. Scholes, the Curator of Historical Relics to the British Transport Commission under whose direction the restoration has been carried out. The work of restoration was done at British Railways Locomotive Works, Derby.

Unclaimed Motorcar

Railway officials tried unsuccessfully for 10 months to locate the owner of a dilapidated 1930 Chrysler motorcar which had been consigned at Emu in Northern Victoria to Brighton near Melbourne. It finally became unclaimed property subject to auction.

Revival of Railway Rugby Club

The London Midland & Scottish Railway Rugby Club was formed in 1927, but was disbanded on the outbreak of war in 1939. Now it is being re-formed as the London Midland Region Rugby Club. Its home ground is at London Road, Wembley. The first match is at home against Thomas Cook & Son Ltd. tomorrow (Saturday). The fixture list for this season is already fairly full. There are plans for a second fifteen in the 1960-61 season. The Chairman of the Club, Mr. R. L. E. Lawrence, Divisional Traffic Manager, London, an old Blackheath player, is largely responsible for its revival. The Secretary is Mr. Leslie Jackson.

Return of Caledonian "Single"

A famous veteran locomotive, Caledonian Railway No. 123, resplendent in Caledonian livery blue, has returned to her Glasgow birthplace—the Hyde Park Works of the North British Locomotive Co. Ltd. No. 123 was built to the order of the former Caledonian Railway for the Edinburgh Exhibition of 1886 during the late Dugald Drummond's term of office as Locomotive Superintendent. Neilson & Company, one of the original companies now forming the North British Locomotive Co. Ltd., were the builders, and the locomotive was delivered in 66 days from the receipt of the order.

She took part in the famous race from London to Edinburgh in 1888. Throughout the racing, only one engine was used by the Caledonian Railway on the West Coast route between Carlisle and Edinburgh—No. 123. After the racing, 123 remained on the Edinburgh-Carlisle run for a long time and later worked between Glasgow and Carlisle. Then she went to Perth and worked between there and Aberdeen, and concluded her working life at the head of the Directors' Saloon before she retired in 1935. In March, 1958, she returned from retirement and has been used for railway enthusiasts' excursions. — *From "The Locomotive Journal."*

Former Midland Railway locomotive No. 1000 *restored at British Railways Locomotive Works, Derby*

The Bromsgrove Railway Gravestones

An appeal has been made by the Vicar of Bromsgrove, the Rev. F. G. Shepherd, for money to restore the lettering on the well-known stones in Bromsgrove Parish Churchyard marking the graves of Thomas Scaife and Joseph Rutherford, who were killed in a locomotive boiler explosion on November 10, 1840, at Bromsgrove Station, on the Birmingham & Gloucester (later Midland) Railway, at the foot of the Lickey Incline. British Railways, London Midland Region, is reported to be considering financial assistance.

The two gravestones each show what appears to be one of the 4-2-0 American (Norris) locomotives supplied for working the Lickey Incline, but the engine that exploded was a privately-owned experimental locomotive named *Surprise*, sent for a trial run in the hope that the Birmingham & Gloucester Railway might be induced to buy it.

On Thomas Scaife's gravestone, erected in 1842, are the following lines :

My *engine* now is cold and still;
No water does my *boiler* fill;
My *coke* affords its flame no more;
My days of usefulness are o'er;
My *wheels* deny their noted speed;
No more my guiding hands they heed;
My *whistle*, too, has lost its tone,
Its shrill and thrilling sounds are gone;
My *valves* are now thrown open wide;
My *flanges* all refuse to guide;
My *clacks*, also, though once so strong,
Refuse to aid the busy throng;
No more I feel each urging breath;
My *steam* is now condensed in death;
Life's *railway's* o'er, each *station's* past;
In death I'm stopp'd and rest at last;
Farewell, dear friends, and cease to weep;
In Christ I'm safe, in Him I sleep.

These lines are not original. With only two verbal differences they appear on an inscription in Whickham churchyard, Co. Durham, to Oswald Gardiner, who died in an accident on the Newcastle & Carlisle Railway on August 15, 1840.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Durban Harbour Development

A start is to be made soon by South African Railways & Harbours on a £1,000,000 development scheme in Durban bay to accommodate 50,000-ton super tankers. This scheme, which will bring Durban into line with other major world seaports, will involve the deepening of the turning basin; construction of a new 800-ft. deep water wharf, and the reclamation of some 100 acres of land south-west of the causeway to Salisbury Island in the middle of the bay.

RHODESIA

Bulk Transport of Molasses

Molasses from the Triangle Sugar Estate is moved in bulk containers. It is pumped into portable 650-gal. tanks at Triangle and these are taken 46 miles by Rhodesia Railways Road Motor Services lorry to Mbizi Station close to the intersection of the South East line and the Fort Victoria-Beit Bridge road. The containers are then lifted by crane on to railway wagons modified to hold eight tanks each.

Mbizi Station was opened mainly for the convenience of the sugar estates, although recently there has been considerable traffic in contractors' materials for the Kyle Dam and canal scheme. Some 13,000-15,000 tons of sugar and 500,000 gal. of molasses are expected to be handled at Mnizi this year.

Work Study

Rhodesia Railways are to expand activities in the work study field. A curriculum is to be introduced for work study trainees selected from interested members of the staff who will be required to pass a qualifying examination on completion of the course. The Railways' Chief Study Officer will prepare the syllabus curriculum, but it will also be approved by a firm of consultants specialising in work study field.

Considerable numbers of employees drawn from a variety of artisan and salaried staff grades have already attended appreciation courses given by the Railways' existing work study staff.

INDIA

New Rolling Stock Spare Parts Factory

The Deputy Railway Minister recently announced that of the total sum of approximately £3,590,000 estimated as the cost of the new factory at Manduadih on the North Eastern Railway near Varanasi, some £525,000 had already been spent. This factory is to manufacture spare parts required for locomotive and rolling stock maintenance in railway workshops, of which there is at present a serious shortage. It is also to undertake the reconditioning of machine tools of all ordinary types in use upon the railways. Associated with the new factory are a technical school, basic training workshop, and an apprentices' hostel, all of which have already been completed.

Railways Invest in Road Services

The Ministry of Railways is to invest a sum of £375,000 in road services in India during the current financial year. It will be allocated as follows to services in the three States, Bihar (£75,000), Mysore (£131,250) and Andhra Pradesh (£168,750).

NEW ZEALAND

Rail Development in Hamilton

A £1,000,000 scheme involving the lowering of the railway line through Hamilton was accepted by the Hamilton City Council in April after a conference with the National Roads Board. The Board had submitted new proposals designed to overcome Hamilton's traffic problems. The Government will find £880,000 of the estimated £1,080,000 required to complete the project. Hamilton's share will therefore be £200,000. A new railway bridge across the Waikato River at Hamilton will be an important part of the scheme, and officers of the Ministry of Works, Railways Department, and City Council are now conferring on details of the design work and planning of the project, which is expected to occupy about four years.

Bulk Cement Wagons

Three wagons for the conveyance of cement in bulk were completed in April at the Addington railway workshops, Christchurch, for the New Zealand Cement Co. Ltd. The containers were supplied by a Swedish firm. They will be used for the transport of cement from the company's new works near Westport to destinations in the South Island.

UNITED STATES

Track Re-locations in Arizona

Re-locations of two main line sections of the Atchison, Topeka & Santa Fe Railroad in Arizona, to cost $22,000,000, are the subject of applications for sanction to the Interstate Commerce Commission. One is for a new line, 44 miles long, between Winslow and Williams, which will cut out a 7,300-ft. summit, approached by long stretches of 1 in 70 gradient and many sharp curves. The line will be double track signalled for reversible working on each track, and with its capacity for considerably higher speeds will allow for appreciable acceleration. The second scheme is a simple re-location of 37 miles of the single-track Ash Fork-Phoenix line, between Arba Siding and Skull Valley.

End of Santa Fe Steam Power

Until now the Atchison, Topeka & Santa Fe Railroad has maintained in running order a few steam locomotives, chiefly of the large 4-8-4 type, as a reserve for handling peak traffic, but with 69 additional diesel units in course of delivery, the last remaining steam locomotives are now to be scrapped. One 4-8-4 and one 2-10-2 are to be preserved, in addition to the 39 Santa Fe steam locomotives which already have been presented to public parks.

Norfolk & Western-Virginian Merger

A large majority of the stockholders of the Norfolk & Western and Virginian Railroads has voted in favour of the merger of the two lines. The plan has been submitted to the Interstate Commerce Commission, and the companies hope to obtain sanction before the end of 1959, estimating the annual savings at $12,000,000 at least. The only opposition is from one of the railway labour unions.

Deriving their revenue mainly from the carriage of coal, the N. & W.RR. and V.RR. are two of the most propserous railways in the United States. The

Bulk cement wagon built at Addington railway workshops, Christchurch, New Zealand

former operates 2,132 route miles and the latter 608 miles, of which 136 miles of the principal main line are electrified. All the Virginian traffic is either electric or diesel worked; the Norfolk & Western has been the last supporter of steam in the U.S.A., but is adopting diesel traction.

Hood Diesels for Main Line Service

In the latest American diesel designs for fast main line freight service the former streamline casings are being abandoned, and the hood type, with a single driving cab only, is being adopted. The Atchison, Topeka & Santa Fe Railroad is now taking delivery from Alco Products of 2,400 h.p. Co-Co units of this type, with the short front hood lowered to give the driver a field of vision across the entire front of the locomotive when running with the cab leading.

ARGENTINA

Electrification of Roca Railway

Preliminary proposals for the electrification of the General Roca Railway have been received from Japanese, French, Belgium, and Dutch firms, and also from a group of British manufacturers. Some of these have asked for an extension of the time limit so that they can submit more detailed plans. Tenders will probably be called for by the beginning of 1960.

Signal Equipment to be Made in Argentina

The Argentine State Railways (E.F.E.A.) have signed an agreement with the General Railway Signal Company of Rochester, U.S.A., by virtue of which the latter undertakes to erect a factory for the provision of railway signalling equipment. They will subsequently install C.T.C. between La Paz and Alto Verde (General San Martin Railway) and Victoria and Pergamino (General Mitre Railway), as also automatic signalling between Retiro and Boulogne and Puente Alsina and Tapiales (General Belgrano Railway), Lynch and Pereyra (General Urquiza Railway) and Caseros and Pilar (General San Martin Railway). Electric signalling will also be installed at Federico Lacroze goods and passenger terminals (General Urquiza Railway).

Northern Transandine Line Blocked

Snow to the depth of three metres recently covered the Northern Transandine line at Chuqilaqui. The train service was suspended.

SWITZERLAND

Lucerne-Engelberg Scheme

The Swiss States Council and National Council have ratified the proposal to link the metre-gauge Brünig line of the Federal Railways at Hergiswil with the Stansstad-Engelberg Railway at Stansstad. The work involves a tunnel one mile long under the Lopperberg; a reinforced concrete viaduct, which may be combined with a road bridge, over the narrow entrance from the Lake of Lucerne into the Alpachersee, with headroom for lake steamers and motorships; and a new station at Stansstad. The Stansstad-Engelberg Railway is to be completely reconstructed, and equipped for the standard Swiss Federal 15,000-V. a.c. traction, in place of the present 850-V. d.c. Six three-coach electric train sets are to be built, which will run through to and from Lucerne.

Fast trains between Lucerne and Engelberg will take 50 min., against the present 1½- to 2-hr.-journey by steamer and rail. One factor in the accleration to and from Engelberg will be a reduction from 20 to 7 min. in the time needed over the 1 in 4 rack-and-pinion section between Obermatt and Gherst, while the 12 small independent locomotives now stationed at Obermatt to work the trains up and down the rack will be no longer needed. Of the estimated cost of £1,833,000 for the whole scheme the Federal Government is to provide two-thirds. The work is expected to take 3½ years.

FRANCE

Pallets for Spanish Orange Traffic

The S.N.C.F. and Spanish National Railways have carried out tests with consignments of oranges to France from four Spanish stations in the Valencia area. The oranges were carried in bulk in folding box pallets, or in cases or cartons placed on ordinary pallets. The tests are reported to have satisfied consignors and consignees. The development of this type of transport by pallets simplifies and speeds up work at break of bulk stations. Senders of fruit obtain a considerable saving in packing and handling costs.

HUNGARY

Budapest—Vienna Non-Stop Service

The journey time between Budapest and Vienna has been reduced to 4 hr. on introduction of a Hungarian-built diesel train running non-stop. The route is understood to be via Györ and Hegyeshalom. This compares with the pre-war timing of 2¾ hr. non-stop.

Publications Received

The Ministry of Transport and Civil Aviation.—By Sir Gilmour Jenkins, K.C.B., K.B.E., M.C. New Whitehall Series. London: George Allen & Unwin Ltd., 40, Museum Street, W.C.1. 8¾ in. by 5½ in. 231 pp. Price 21s.—Sir Gilmour Jenkins retired recently after serving as Permanent Secretary to the Ministry of Transport since 1947. Authorship by a senior civil servant on the work of his own department is the hallmark of the series in which this book appears, for the New Whitehall Series is prepared under the auspices of the Royal Institute of Public Administration with the object of providing authoritative descriptions of the present work of the major departments of Central Government. In its present form, the Ministry of Transport & Civil Aviation is comparatively a modern body, as it was constituted only in 1953, although for two years previously its multifarious functions had been headed by one person holding the two portfolios. Sir Gilmour Jenkins gives in Part 1 a brief survey of the broad functions of the present Ministry, and a short account of its evolution. The main part of the book is in three sections, devoted respectively to the activities of the three broad sections into which the work of the Ministry is naturally divided. These are: Shipping (including ports and inland waterways); inland transport (rail and road) & Highways; and Civil Aviation. The final section deals with organisation, and includes a useful chart and a list showing Ministers and Permanent Heads of the various Departments concerned since 1919 with what are now the functions of the present Ministry. The nature of the subject causes such a work to incur the risk of becoming what the author himself describes as " an auctioneer's catalogue," but the book is of interest to the specialist in transport and also to the general student of public administration. It has, therefore, much of the character of a competent text book.

Famous River Craft of the World.—By F. E. Dean. London: Frederick Muller Limited, 110, Fleet Street, E.C.4. 7½ in. by 5 in. 144 pp. Illustrated. Price 9s. 6d. Railway-owned ships have long played an important part in river and lake navigation. The Clyde services of the former Scottish railway companies, of their successors, the L.M.S.R. and L.N.E.R., and, today, of the Caledonian Steam Packet Co. Ltd., on behalf of the British Transport Commission, are described briefly but clearly in this work. Mention also is made to the British Railways, Eastern Region, Tilbury-Gravesend passenger and road vehicle ferry. There is, however, no reference to the large-scale and efficient riverine services of the Sudan Railways on the Nile and its tributaries.

Tools for Vehicle Maintenance.—The 1959 catalogue of Apkoway tools and hydraulic equipment for the motor and allied trades has been issued by J. W. Pickavant & Co. Ltd., Apkoway Works, Bow Street, Birmingham, 1. Primarily designed for use in service stations and by fleet owners, many of the items described also will be found suitable for industrial plant maintenance and for the acceleration of heavy repair work. It is claimed that because of the versatility of some of the tools, a single Apkoway kit can service most makes of vehicle and so dispense with a mass of expensive special tools. Hub and bearing pullers of many designs and sizes are illustrated and most of these incorporate a standard hydraulic ram. Interchangeable adaptors are available, designed for specific purposes on individual vehicles. Hydraulic bench presses, king pin extractors, valve lifters, grinders, and re-seating tools, circlip tools, a sound detector for locating elusive knocks and thread restorers are among other equipment described and illustrated.

Weedkiller Spray train on Western Region

Sprays up to 68 miles of track without replenishment

The Chipman Chemical Company's new weedkiller spray train working on Western Region lines near Swindon

A NEW weedkiller spray train, incorporating several improvements over previous trains designed for the same purpose, has recently been brought into service on the Western Region of British Railways. With the capacity to spray up to 68 miles of full-width track before needing replenishment, the train has this year supplemented the activities of two Western Region-owned weedkilling trains. One of these was described in our August 20, 1937, issue.

The new train is the third of its kind to be built by the Chipman Chemical Co. Ltd., since the war, the previous two being used by the Chief Civil Engineers of the Eastern, North Eastern, and Scottish Regions. It comprises four 20-ton tank wagons, each of which has a capacity of approximately 4,750 gal. of weedkiller solution ready for use, a messing and sleeping coach for the normal operating crew of three, and a spray van containing the pumps and other machinery, to which are attached the spraying booms. A workshop for maintenance and running repairs is also located in the spray van. For operational purposes the train is completed by two brake vans, so that a locomotive can be attached at either end. All vehicles are close-coupled and fitted with twin-cylinder vacuum brakes.

The spraying equipment is housed in a converted Western Region siphon "G" vehicle, and messing facilities are in a converted North Eastern third-class passenger coach. Both conversions were carried out by the Carriage & Wagon Engineer, North Eastern Region, Holgate Carriage Works, York, and the heavy machinery was installed in the spray van by the General Electric Co. Ltd. Attachment of the four tank wagons and final fitting and testing was carried out by the Chipman Chemical Co. Ltd.

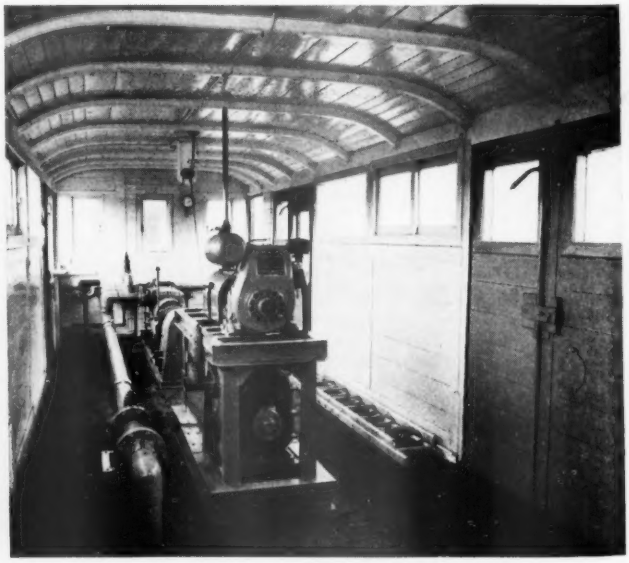
The weedkiller solution normally applied comprises three parts of water and one part of chemical liquid concentrate. The water is fed into the rail tank wagons from a water tower and the chemical concentrate is pumped across from supply tank wagons by a portable Warsop centrifugal pump.

Mixing is accomplished by blowing air, supplied by a Hydrovane compressor, through the solution via air lines built into each tank. The compressor equipment is housed in the spray van.

Rate of Spray

As standard practice, spraying is carried out at the rate of approximately 280 gal. of weedkiller solution per mile,

Interior of converted brake-van, showing cable from belt pulley to speedometer, and spray control equipment



Another view, showing pipe connecting tank wagons to pump, which is below engine for air compressor

The twin-spray system in action

generally over a width of 17ft. 6 in. Normal spraying speed is 20 m.p.h. and at this speed the nozzles deliver solution at the rate of 93 gal. per min.

The main pump, a Megator type GH4, draws the solution from the tanks through 4-in. piping connected to the base of each tank and running along the tanks, under the messing coach and into the spray van. Here, the solution is pumped to spray nozzles at pressure. Between vehicles the piping is joined by 4-in. Fulflex hose couplings.

The drive is by V-belts from one of the vehicle bogie axles to a gearbox and then via a marine reversing clutch to the pump. In this way, pump output is related to the speed of the train, thus ensuring delivery of the correct amount of weedkiller solution. A feature of the new pump is that it requires comparatively little maintenance and can be easily compensated for wear. It is able to deal with all types of weedkilling mixtures, including those containing insoluble powders in suspension. The reversing clutch enables the train to spray while travelling in either direction.

From the Megator pump the weedkiller solution, under pressure, is divided into several smaller lines and then passes through quick-acting valves into the spray booms and out through the nozzles.

An innovation in this train is the duplication of the spray booms across the entire spraying width. When the train is travelling at less than 10 m.p.h., one of the spray systems is turned off, thereby ensuring that a correct spray pattern is maintained at slow speeds, i.e., at lower outputs, without adjustment of pump pressures.

A fixed boom at the front of the spray train covers the " four-foot " and swivel booms extend from each side of the van to cover the cess and " six-foot." Swivelling is controlled by levers on either side of the train. These are operated by two crewmen. The booms can be swung through 180 deg. if necessary. The side booms are easily detachable for maintenance and are attached to their brackets by shear pins which will break on heavy impact preventing damage to booms or mountings. Shoes mounted longitudinally under the nozzles prevent solution falling on the railheads.

There are ten spraying controls, so arranged that the train can spray either the " four-foot " only, shoulders and sleeper ends only, cess and " six-foot " only, or any combination of these.

The instruments inside the spray van include a spray mileage recorder giving daily and summary totals of the length of track sprayed, a speedometer and pressure gauges. At the standard spraying speed of 20 m.p.h., spray pressure is 30 lb. per sq. in. This ratio has been found to give optimum results.

Other equipment includes two portable pumps to transfer concentrate into the tank wagons, a petrol engine-driven Hydrovane air compressor connected via an air line to the tank wagons for agitating the contents, and a Megator M50 pump which can be used in handspraying

The crew lives on the train throughout the spraying season. The messing coach contains four double bunk compartments, a galley fitted with Calor gas cooker and Calor-operated refrigerator, dining compartment heated by a coke-burning stove. washroom, and toilet facilities.

Hot water is provided by a gas water heater, and gas is also used for lighting. Water is stored in the roof of the galley. Extensive use has been made of plastics for easy cleaning and to reduce the need for periodic redecoration.

Crew's sleeping compartment

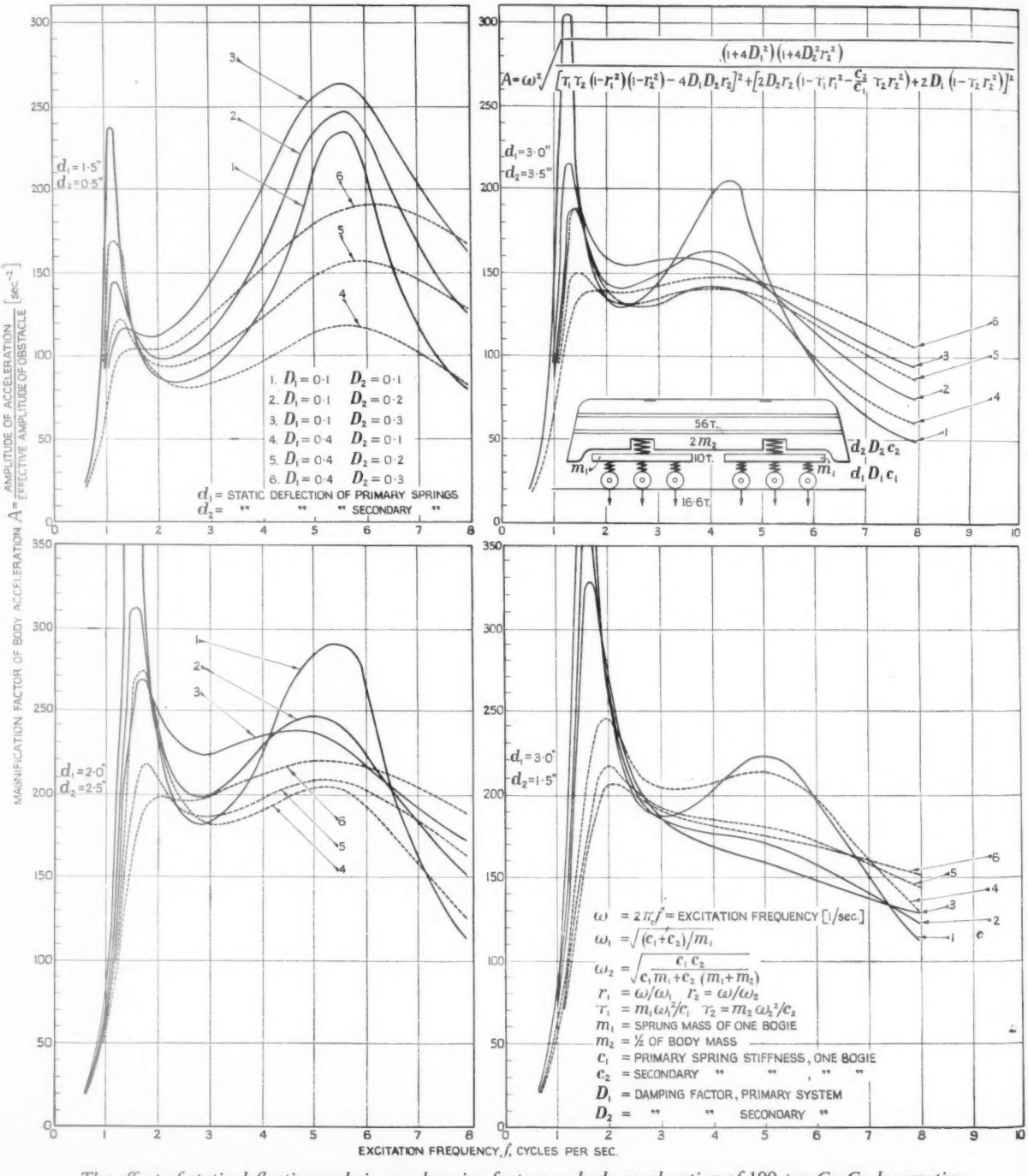
Crew's dining compartment

Vertical Oscillations of Locomotive Bodies

The effect of spring stiffness and damping factors on bouncing

By J. L. Koffman

THE general development of the study of railway mechanics as affecting the running of vehicles has, by the nature of the problem, concentrated mainly on running in the lateral plane. This preoccupation was enhanced by the special conditions prevailing on railways i.e., tyre conicity, flange profile, rail-head shape, flange-to-rail clearance, locomotive wheel arrangements, friction forces, and specialised investigations dating back to Max Maria von Weber (1) (son of the composer). These culminated in the painstaking, detailed, and far-flung theoretical researches of Heumann



The effect of static deflection and viscous damping factors on body acceleration of 100-ton Co-Co locomotive

(2). Heumann, aided by a number of faithful followers and such authorities as Professors Baseler and Pflanz, has brought the theory of vehicle-running in the lateral plane, both in the straight and in curves, to a very high state of exactitude. There is thus a volume of fundamental knowledge of the utmost value for further development in this sphere (3). Much valuable work was done by Carter and an important paper was published before the war by Davies (4). More recently, the efforts of the Office of Research & Experiment (O.R.E.) of the U.I.C., under the progressive leadership of Dr. F. Q. den Hollander, have been instrumental in sponsoring theoretical work relating to the problem of hunting.

Idealised Premises

While this work admittedly is based on somewhat idealised premises, it is to be hoped that it will aid a better understanding of the relevant problems. Already, the dynamic aspects of vehicle running in the lateral plane have received due attention, notably by Mauzin (5), Müller (6), and de Pater (7). On the other hand, the dynamic aspects of vehicle running in the vertical plane have benefited relatively little from work carried out, particularly in the automotive field, as far as vehicle vibrations are concerned. A notable exception has been the book by Cain (8) but very little, if any, use seems to have been made of subsequent papers by Lehr (9), Chudakov (10), Marquard (11) and others.

Only in relatively recent years have railway workers began to proceed along advanced lines, and here special mention should be made of the papers by Matsudaira (12), Sperling (13), Tibilov (14), Chartet (15), Borgeaud (16), Zweifel (17), and Medel (18). So far, considerations have been mainly restricted to problems of one degree of freedom, i.e., the oscillations of a body supported by a spring with a damper across it. In a few cases the considerations have been expanded to deal with two degrees of freedom (12, 13, 17, 19), sometimes with dampers across the secondary system only (12), or by simplifying the conditions when using dampers across both systems (13, 19).

Two Degrees of Freedom

Nevertheless, the problem of oscillations of a system with two degrees of freedom, in addition to bogie vehicles with primary and secondary suspensions, applies to other engineering structures such as motorcars, in which tyres are equivalent to bogie axlebox springs and the springs to bogie bolster springs, while at the other end of the scale, steam turbines will also be of assistance. Here, the mass of the foundation is carried on elastic supports, thus being equivalent to the sprung portion of the bogie on the axlebox springs, while the rotor possessed of certain elastic and damping characteristics is equivalent to the vehicle body resting on the bolster springs. Both systems have been considered in some detail elsewhere (20, 21).

These considerations apply to a simple two-degree of freedom system subjected o translatory oscillations only. In terms of railway vehicles the solutions apply solely to bouncing and will not cover the more complex modes of pitching, swaying and hunting, or the even more complex interaction due to the coupling present between the different modes (22).

General Behaviour Pattern

Even so, results obtained are indicative of the general pattern of behaviour as influenced by the main design parameters. While the effect of suspension characteristics on dynamic deflection of primary springs, and with it the dynamic load augment resulting from the sprung parts as imposed on the track, was dealt with in a previous article (23), it is of interest to consider also the behaviour of the suspension in terms of vertical body oscillations,

The example considered in this case is the same as that dealt with previously, i.e., a 100-ton Co-Co electric or diesel locomotive with a body weighing 56 tons and the sprung portion of each bogie weighing 10 tons. The static spring deflections were chosen to ensure an overall value of 6·5 in. and 4·5 in. In the case of the former the deflection has been distributed to 1·5 in. and 5 in. and also 3 in. and 3·5 in. for the primary and secondary suspension respectively, while in the latter case the distribution was assumed to 2 in. and 2·5 in. and 1·5 in. and 3 in. respectively. These distribution values were assumed to investigate the effect of harder primary and softer bolster suspension in terms of dynamic load on the track as well as its effect on vehicle riding in terms of body acceleration.

Primary Suspension

As far as primary suspension is concerned, limits are set to increase spring stiffness by considerations also relating to track conditions, particularly when running in or out of curves (24). Thus, with a rise in the transition curve and a four-wheel bogie with a wheelbase l, the spring deflection will be:

$$d = nl/4$$

With $l = 120$ in. $n = 1$ in 300, $d = 120/(300 \times 4) = 0{\cdot}1$ in. in the plane of the wheel. With the spring stiffness c (tons per in.) and the spring positioned at a distance s_1 from the centreline of the bogie, while the rolling circle of the wheel is at a distance s, the spring deflection will be

$$d_s = d(s/s)$$

while the spring force concerned will be

$$\triangle F_s = d(s_1/s)c$$

The change in wheel-load L_w (tons) will be obtained from

$$\triangle F_s \times s = \triangle d_s \times s_1$$

so that: $\triangle F_s = dc(s_1/s)^2$

For $s = 29{\cdot}6$ in. $s_1 = 39$ in. and $d = nl/4$,

$$F_s = 0{\cdot}44\ nlc$$

The magnification factor A of the locomotive body is calculated as the ratio of body acceleration divided by the effective height of the obstacle. The equation concerned is somewhat complex and the working out " by hand " is time-consuming. This is probably one of the main reasons why considerations of this type have not previously been carried out when dealing with new vehicle designs. More recently, the development of digital computers made such determinations very easy once the necessary equations have been set up—the calculation of all results plotted in this article took about 10 min. once the computer had been suitably set up. It is of particular interest to compare the results thus obtained with the previously published curves relating to primary springs (23). In the present case, the generally lowest values of the magnification factor A are obtained with a primary static deflection of 1·5 in. and a secondary static deflection of 5 in., a primary damping factor of 0·4, and a low secondary damping factor of 0·1. The next best riding qualities are ensured with a primary and secondary static deflection of 3 in. and 3·5 in. respectively, and the secondary damping value increased to 0·2 of the critical. This is followed by a suspension with a static primary and secondary deflection of 2 in. and 2·5 in respectively, while, depending on the range of speeds, damping factors should be 0·4 for the primary and 0·1 to 0·2 for the secondary suspension. Finally, with a static deflection of 3 in. for the primary and 1·5 in. for the secondary suspension, a damping factor of 0·4 and 0·3 respectively should be aimed at. These values apply for vehicles with a maximum speed of up to about 100 m.p.h., as in this case when running over 60-ft. rails and assuming excitation impulses every 30 ft. the frequency should not exceed 5 cycles per sec.

Dynamic Loads

As far as dynamic loads resulting from primary spring deflection are concerned (23), at speeds of 40 to 70 m.p.h. best results are obtained with $d_1 = 1{\cdot}5$ in., $d_2 = 5$ in., $D_1 = 0{\cdot}4$ and $D_2 = 0{\cdot}1$, while at speeds of 70 to 100 m.p.h., the combination of $d_1 = 3$ in., $d_2 = 3{\cdot}5$ in., $D_1 = 0{\cdot}4$ and $D_2 = 0{\cdot}1$ would ensure minimum dynamic loads resulting from the action of sprung components. These examples indicate the desirability and possibility of considering suspension system performance, not only in terms of what may be felt when riding in the vehicle but also in terms of action on the track.

Further Considerations

While it must be admitted that the above considerations are at this stage limited to bouncing, while the dynamic loads are those resulting from sprung components only, it is hoped that the plots of the relevant dependencies will be of sufficient interest to encourage further considerations along these lines to ensure an all-round optimum design of vehicles as far as riding qualities and loads imposed on track are concerned. Here, dynamic considerations already playing an important role as far as vehicle riding qualities are concerned must not be neglected to favour those which are easier, predominantly static, and augmented by a generalised speed factor frequently used to determine rail stresses resulting from the passage of vehicles. This is particularly the case if vehicle design is to be encouraged to develop along rational and effective lines.

Acknowledgment is made to the

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Director of Research, British Railways, for permission to publish this article.

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Experimental Ballast-Sealing with Asphalt in the U.S.A.

Use of spraying without previous asphalt coating of ballast

UNDER the auspices of the Engineering Division of the Association of American Railways and the Asphalt Institute, tests are still being made in the U.S.A. with asphalt-treated ballast. They have been going on since 1926 when the New York Central administration initially treated 600 ft. of track with emulsified-asphalt-coated stone ballast. Reports made 18 years later upon this test-length were remarkably favourable.

The procedure followed was that an 8-in. depth of clean ballast coated with emulsified asphalt was first placed under sleepers the sides and end of which were painted with emulsified asphalt. After packing, the surface was sealed all over with a 1-in. layer of a mixture of emulsified asphalt and wet sand. For 14 years no work nor any minor repairs were carried out on this length. The sealing coat was then repaired in a few places where it had become shattered, and cracks between it and the sleepers caused by creep were filled. Between 1941 and 1944 a few low joints were packed up and some loose sleepers were tightened; re-railing took place in 1942. Even then, during the five years 1940-44 inclusive the annual maintenance labour averaged only 42 ganger-hours and 108 gang man-hours and very little material was used. These results were considered eminently satisfactory as the test-length was in a high-speed road and smooth running was maintained. Moreover, better alignment and surface resulted than with conventional untreated stone-ballasted track. It is also claimed that the use of emulsified asphalt as opposed to the hot-mix type retained pliability and made joint lifting and repairs to the sealing possible.

Nevertheless, asphalt paving cement at temperatures of 275°-350° was subsequently applied on a half-mile test-length of the Illinois Central Railroad. It was covered with a layer of limestone screenings well brushed in and packed, and there followed a second application of asphalt and sealing coat aggregate spread over a width of 12 ft. Some 7,200 gallons of asphalt were used to secure a penetration of 3 in.-4 in. Reports state that serious track lining was required only once in 10 years, but as there had to be excessive maintenance during the last three of the ten years, the economic life of this system of asphalting is placed at seven years. However, it did secure a continuance of smooth running and a doubling of the life of the sleepers in the test-length. Also there was considerable saving in that the whole 8-in. depth of ballast had not to be coated.

Trials with Long-Welded Rails

The most recent trials, begun during this last spring on the Santa Fe road, have the advantage of being associated with 78-ft. and 117-ft. long-welded rails connected with either tight or conventional bolted joints. The ballast used is either crushed gravel, crushed limestone, crushed slag, crushed chat or volcanic cinders. Six test sections with an aggregate length of 25 miles are being treated on the Santa Fe system, and other administrations are expected to follow suit. On one of these lengths near Barstow, that had been recently relaid, the asphalt spray from specially-designed vehicles was applied at the rate of 1¼ gal. per sq. yd. and penetrated into the stone ballast to a depth of 2 in. The over-layer of chippings was spread at the rate of 10 lb. per sq. yd.

The two spreader-wagons designed for these tests are (1) an asphalt-distributor, and (2) a stone-spreading wagon. The former is equipped with a pump, a hot-oil system to maintain heated supply piping, a tachometer governing the asphalt distribution, and (a) outrigger and (b) "four-foot" sprayers. Shoes are provided to protect the rails from the spraying. The asphalt is drawn from adjacent tank-wagons with the aid of a 22-ft. swinging boom at each end of the spraying-wagon. The stone-spreading wagon is of the usual bottom-dump twin-hopper type and has a capacity of 50 tons. Between the two hoppers is mounted a petrol-electric generator supplying power to two motors distributing the screenings. A rotary finger on each side beneath one of the hoppers throws the stone against baffle-plates directing it over a width extending from the sleeper-ends to about 7 ft. from the track centre-line on each side of the vehicle. The other hopper feeds stone over the width between the sleeper-ends.

On the Barstow test-length the rate of distribution and penetration mentioned above was achieved with two passes of the spraying car over the length. This was necessary because the pump was capable of delivering only 1 gal. of asphalt per sq. yd. when travelling at a speed of 2 m.p.h., and because the ballast train could not be worked at a slower speed. Either a larger pump or a second spraying car will be used in future, and as the work proceeds other improvements will doubtless be possible in the procedure and equipment.

BENGUELA RAILWAY REPORT FOR 1958.—Receipts of the Benguela Railway Company in 1958 are shown in the report as escudos 428.6 million, against esc. 463.9 million in 1957. Goods traffic decreased by esc. 39 million. Receipts from sundries were esc. 3.6 million above, and passenger takings very slightly above the previous year's totals. Working expenses in Africa were esc. 240.8 million (235.6 million in 1957). The amount transferred to the renewals fund was esc. 20.1 million, as in 1957. Expenses in 1958 were esc. 5.2 million more than in the preceding year. A further 20,248 4 per cent debentures are to be redeemed. The company received Government authority in 1958 to issue new 5 per cent debentures up to esc. 800 million with interest and repayment a charge on railway earnings even after the end of the concession. The draft of the relevant trust deed has been submitted to the Government. During the year esc. 24 million was invested in buildings and equipment including esc. 1.3 million for construction of rolling stock, esc. 1.2 million for signalling improvements and esc. 2.7 million for re-equipment of workshops and depots. The programme of new investments for 1959-61 provides for expenditure of esc. 119.4 million. To replace the bridge over River Catumbela, in use since 1905, a metal bridge of 85-m. span, is being built and is expected to be completed towards the end of next year.

Repair of Diesel Railcar Power Units at Derby

Flow-production methods used for engine overhaul and rebuild

Piston sub-assembly section showing excellent bench lighting, and general cleanliness

THE repair shop established and equipped at Derby locomotive works for the complete overhaul of 30 diesel railcar engines a week is a good example of the installation required to carry out this work economically, and to the makers' repair standards. Noteworthy features of the layout are the extent to which the work is divided into sections, and the distinct division between the work of dismantling and assembly. In effect this means that batches of dismantled components ready for further use are delivered to a central store, and from this store are drawn sets of parts for the building of engines on a flow production basis.

Shop Layout for Continuous Work Flow

At the entrance end of the repair shop is an annexe, 30 ft. x 47 ft., in which the engines are cleaned externally, stripped, and then all components cleaned. Thor pneumatic hoist blocks of 2,000 lb. capacity, mounted on overhead runways, are used for handling, and transport from the stripping and cleaning annexe is by roller conveyor.

Approximately one-third of the main shop, which is 86 ft. long x 47 ft. wide, is used for component inspection, rectification, and the storage of components and sub-assemblies. Following the small component store is a rebuild section and storage compound for heavy components such as cylinder block and crankshaft assemblies. The assembly line for the rebuild of complete engines extends from this point to the despatch bay. On one side of the despatch bay is a dynamometer test bed and on the other side offices for the foreman, storekeeper, and clerical staff. The fuel injection equipment room is in an extension of the main shop, adjacent to the office block.

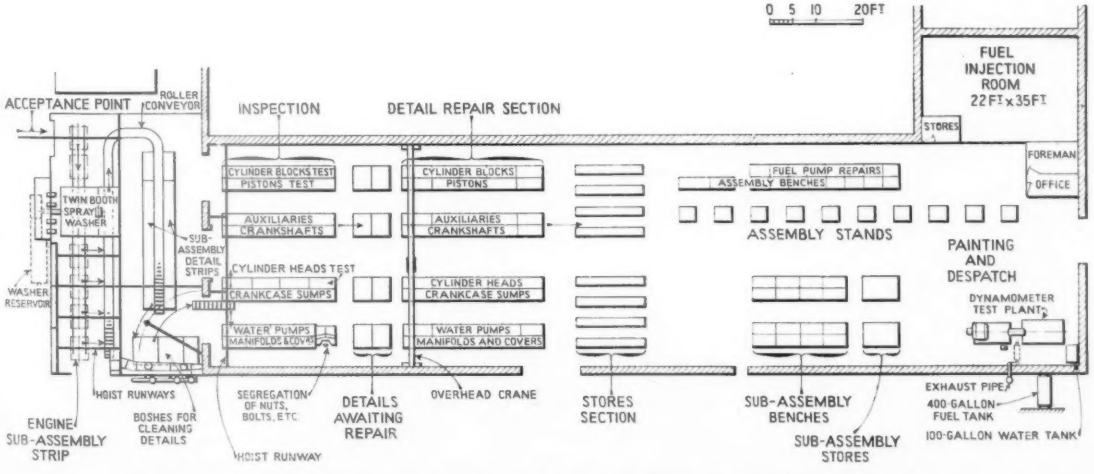
All work benches are fitted with aluminium tops and the shop floor is tiled. Heating is by blower fan steam radiators and the general shop lighting is supplemented by extensive lighting over the benches.

Cleaning Before Inspection

When an engine is received in the annexe, equipment such as the fuel pump and starter motor are removed and the engine passed through a twin chamber high pressure detergent spray washing plant for external cleaning. The large chamber of the spray booth is 5 ft. 3 in. x 6 ft. 3 in. x 10 ft. long, two Girdlestone pumps each delivering 300 gal. per min., supplying the multi-spray cleaning nozzles. The spray booth has a 1,000 gal. capacity sump and the steam heating of the solution is thermostatically controlled. This initial cleaning is followed by dismantling of the engine into its sub-assemblies. These are loaded into trays and passed on the roller conveyor through the smaller spray booth, which measures 4 ft. 3 in. x 4 ft. 3 in. x 10 ft. long. Sub-assemblies are then completely dismantled at benches alongside the conveyor, the components loaded into baskets and thoroughly washed in a steam heated bosh. Three boshes are installed, fitted with Keith Blackman blower and fume extractor fans.

In the transfer from the stripping section to the main shop, the clean components are divided into eight streams comprising cylinder blocks, pistons and connecting rods, auxiliaries, oil pumps, crankshafts, cylinder heads, crankcases, water pumps, manifolds and covers. All loose studs, bolts, and nuts are dropped into a container, and after sorting into respective sizes returned to stores. The recovery percentage is high and the job is carried out by disabled personnel.

In the main shop inspection of the



Plan of railcar engine repair shop Derby Works, British Railways, London Midland Region

Injection equipment room has dust-extraction tundish fitted at each assembly station

parts, covering visual, dimensional, and hydraulic pressure testing as required, is the first operation. Paint colour coding is used on each part by inspection to identify parts which may be refitted, rectified, or scrapped. Usable parts pass immediately to the sub-assembly stores, and replacements for scrapped parts are drawn on the inspectors' authority from the works main component store. This system ensures that, for each engine received, a complete set of parts is available in the sub-assembly stores when required for the rebuild.

With the exception of certain partly worn items, such as cylinder blocks, pistons, and connecting rods, which, by matching, can be used for a further period, no attempt is made to rebuild the engine from the same sub-assemblies originally used.

The inspection bay is well equipped with the special tools, gauges, and a water test fixture required for each engine type. All crankshafts are examined on a Fel-Electric magnetic crack detector, and a Hanovia ultra violet ray lamp is used for crack detection on smaller components. Valve springs are loaded and measured on a Britool dial-reading spring tester. Racks and bins at the end of each inspection bench are used for the storage of parts requiring rectification.

If welding, machining, or crank regrinding is required the parts are sent into the main works. Equipment has recently been installed in the works to investigate the extent to which electrochemical means can be used in the building up of worn parts. This equipment, using the Dalic process of metal depositing, has been installed by Metachemical Processes (London) Limited.

Fuel-Injection Equipment

The equipment installed and the arrangements provided for the servicing of fuel injection equipment is of the highest possible standard. The "clean room" is 35 ft. long and 22 ft. wide, with fitted benches and cupboards on each side and the calibrating machines and storage racks in the centre. The floor, benches, and racks are linoleum covered. To secure maximum cleanliness all pumps and injectors are dismantled and cleaned before being brought into the clean room. Each set of cleaned parts is delivered in a tray provided with a socket for each component. Pump plungers and cylinders are first tested for rate of leakage on a Merlin comparator. Injector valve seats are ground and lapped on a Merlin Servicemaster.

Plastic hoods are used to cover all equipment until required for immediate use, and on the benches are roller-mounted canvas covers for the overnight protection of work in progress. For pump calibration there is a Merlin Calimaster and a Hartridge test machine. On the injector bench are three C.A.V. hand pump test units.

For the rebuilding of complete engines the cylinder block forming the main carcase is mounted on a portable stand, ten of these stands forming the assembly line. The portable stands provide flexibility in the progress of an engine along the line, according to building priority. Movement of engines is by a battery-electric pallet transporter.

A continuous bench at the side of the track is used to keep equipment off the floor during assembly. Patrol inspectors on the line ensure that the required high standard of cleanliness and workmanship are maintained, and that the complete build is to specification requirements.

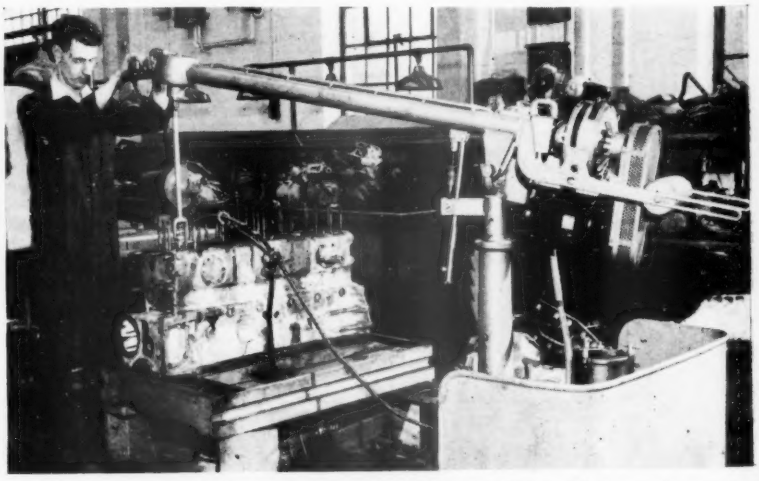
Bench Testing

At the completion of the build the engine, fitted with auxiliaries, is run-in and load tested on a Heenan and Froude type DPY 5 hydraulic dynamometer. Driving through the brake is a 35-h.p. variable-speed electric motor. This is used to motor the engine for a short period to remove initial stiffness and circulate the oil. Following a run of 30 min. at no load the engine is run for 2½ hr. with progressive load increments at speeds of between 1,000 and 1,800 r.p.m.

There follows a series of tests over the same speed range at the maximum rated horse-power for each speed. Fuel consumption is checked with a Flowrater meter, measuring the rate of fuel flow in c.c. per second. The test bed is equipped with a 400 gal. fuel tank, and a 100 gal. cooling water header tank fitted with a Drayton automatic temperature regulator.

Lifting of the engine on and off the test-bed and on to the transport vehicle after painting, is by the 1 ton capacity overhead travelling crane. This single test bed is inadequate to deal with the flow of engines now being handled by the repair shop and additional test beds are being installed in an adjacent building.

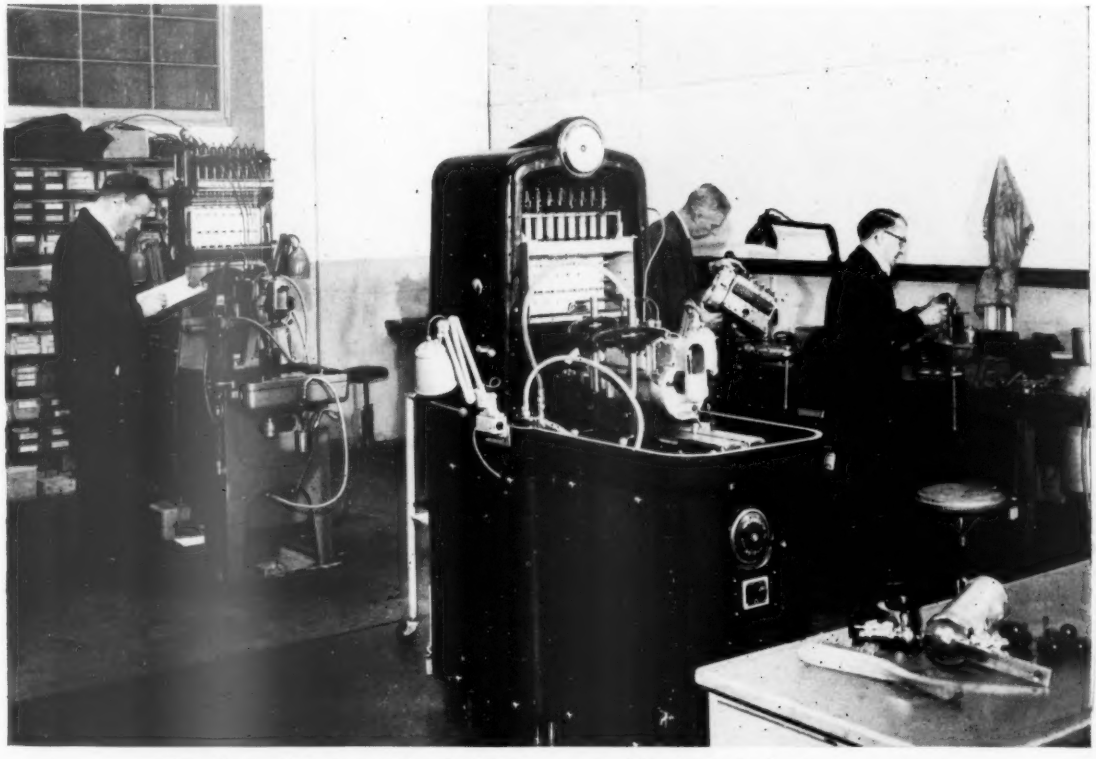
In addition to the overhaul and repair of complete engines an increasing amount of component repair work is carried out for other diesel depots in the Region. A stock of reconditioned components is held in store ready for immediate issue as replacements when defective parts are received. The defective parts are then reconditioned and returned to store or if not repairable new parts are issued as stores replacements.



Floating vertical shaft of Delapena cylinder liner honing machine may be swung to any position over work table

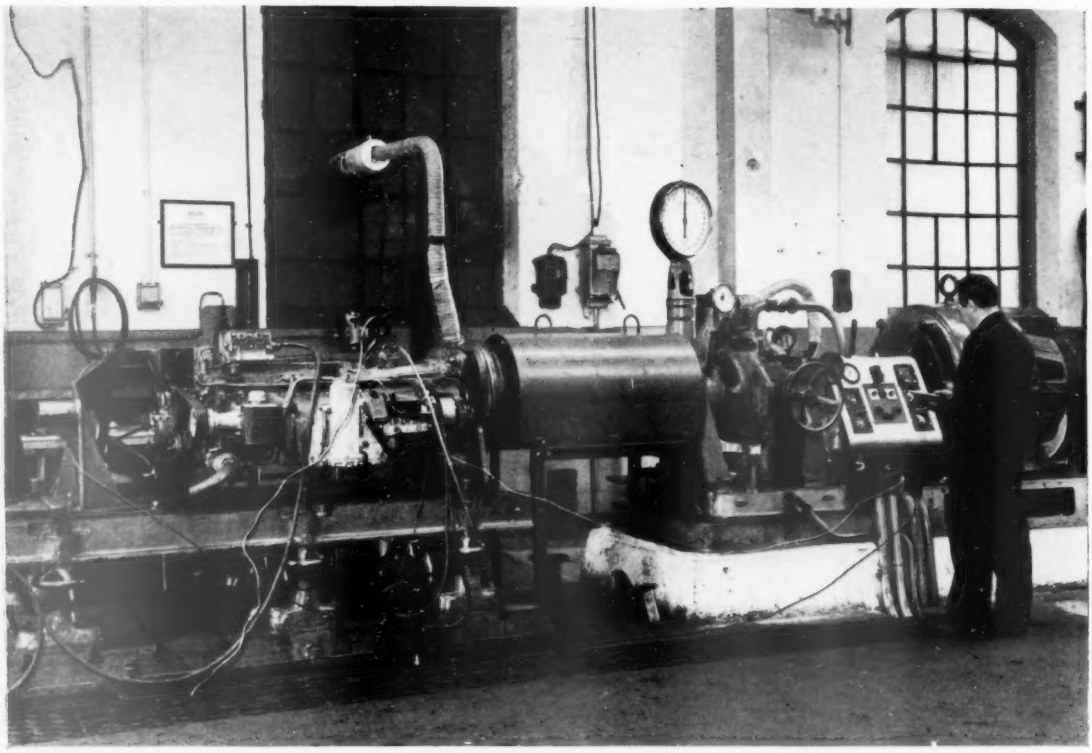
Repair of Diesel Railcar Power Units at Derby

General view of Derby railcar engine repair shop. Storage racks separate the rectification and rebuild sections

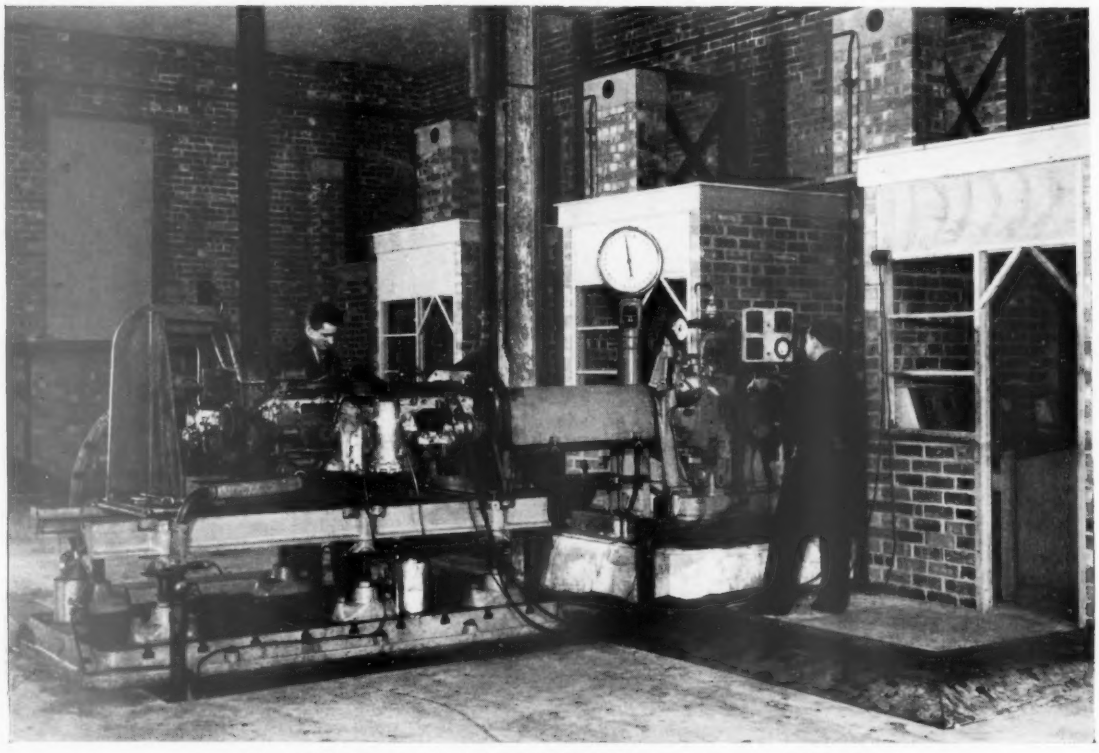


Hartridge and Merlin machines for injection pump calibration in the fuel equipment room

Repair of Diesel Railcar Power Units at Derby



Engine dynamometer brake test in despatch bay. The electric motor for running-in is on the right of control panel



First of the new test beds installed in building adjacent to main shop

RAILWAY NEWS SECTION

PERSONAL

Mr. W. L. King, Chief Electrical Engineer, South African Railways, has retired after more than 43 years' service.

Mr. J. Holden Fraser, O.B.E., B.Sc., A.M.I.C.E., M.I.R.S.E., Chief Signal Engineer, British Railways Central Staff, who, as recorded in our August 21 issue, has retired, joined the Stratford District Civil Engineering Department of the former Great Eastern Railway in 1917. After military service in the 1914-18 war, he returned to the Signal Section, in 1919, and acted as Signal Engineer after the retirement of Mr. W. H. Bird. Mr. Fraser prepared an extensive scheme of colour-light suburban signalling, and on the amalgamation of the Great Northern, Great Central, and Great Eastern Engineering Departments in 1924, he was appointed Indoor Assistant to the Signal Engineer (Southern Area) L.N.E.R., acting also as Outdoor Assistant for the Great Eastern and Southern half of the Great Northern Sections. In 1926, he became Signal Assistant, Edinburgh, and in 1929 Chief Assistant (Signals), Scottish Area. In 1931, he was appointed Assistant Signal Engineer, North Eastern Area, and in 1947 Assistant to Engineer (Signals). On nationalisation of the railways he became Signal & Telecommunications Engineer, North Eastern Region, and was responsible for organising the signal & telecommunications staff into a separate department and for carrying out a number of important projects, including the new signalling installation at York. In 1952, Mr. Fraser was appointed Chief Officer Engineering (Signal & Telecommunications) at the Headquarters of the Railway Executive. In the re-organisation in 1955 Mr. Fraser became Chief Signal Engineering Officer, British Railways Central Staff, at Commission Headquarters, and in February this year was re-designated Chief Signal Engineer. Mr. Fraser was awarded the O.B.E. in the New Year Honours List of 1954. In 1955 he was President of the Institution of Railway Signal Engineers.

Mr. A. Otterburn, Inspecting Clark in the District Traffic Superintendent's office, York, North Eastern Region, British Railways, has been appointed Passenger & Parcels Agent, York.

Mr. A. W. Woodbridge, O.B.E., M.Sc., M.I.E.E., M.I.R.S.E., Signal Engineer, Western Region, British Railways, who, as recorded in our August 21 issue, has been appointed Chief Signal Engineer, British Railways Central Staff, joined the Great Western Railway as a pupil in the Signal & Telegraph Department, Reading, in 1926. He was appointed to the staff, as Head Office Inspector, in 1930, and was in charge of many of the major signalling works carried out by the G.W.R. Later he became Assistant to the Signal & Telegraph Engineer, and in 1947 was appointed Signal & Telegraph Engineer, Great Western Railway. Mr. Woodbridge received his technical education at the City & Guilds Engineering College, where he obtained B.Sc. (London University) in engineering in 1925, and subsequently M.Sc. He is an Associate Member of the City & Guilds Institute, and holds the Diploma of the Imperial College. He was President of the Institute of Railway Signal Engineers 1957-58, and was awarded the O.B.E. in 1958. In 1956, on behalf of the British Transport Commission, he visited the United States of America with other signal engineers, to study aspects of American practice with particular regard to remote control signalling operations (centralised traffic control), both-way working over multiple tracks, and marshalling yards.

Mr. J. Holden Fraser
Chief Signal Engineer, British Railways Central Staff, who has retired

Mr. A. W. Woodbridge
Appointed Chief Signal Engineer, British Railways Central Staff

Ministry of Transport & Civil Aviation Appointments

The Ministry of Transport & Civil Aviation has announced the following changes, which took effect on September 1:—

Mr. C. P. Scott-Malden becomes Principal Establishment & Organisation Officer in succession to Mr. P. J. E. Dalmahoy who is undertaking special duties.

Mr. T. F. Bird, takes charge of the Rail, Inland Waterways, and Road Transport Groups which are being combined.

Mr. R. R. Goodison takes charge of the Aviation Safety & General Group in place of Mr. C. W. Evans, who is retiring.

Mr. B. P. H. Dickinson takes charge of the Shipping Policy Group in place of Mr. T. F. Bird.

Mr. Reep Lintern takes charge of the Shipping Operations, Ports, & Planning Group in place of Mr. Dickinson.

Mr. L. S. Mills, who is being promoted to be Under Secretary, takes charge of the Highways Group in place of Mr. Reep Lintern. A second Under Secretary will be appointed to this group shortly.

XUM

Mr. J. C. Spark, Locomotive Works Manager, Doncaster, Eastern Region, British Railways, has been appointed Works Manager, Doncaster, as part of the reorganisation of technical departments recently announced. The Locomotive, Carriage & Wagon works at Doncaster, Eastern Region, will be under combined control by Mr. Spark.

Captain Sir Ian Bolton, Bt., K.B.E., Chairman of the Scottish Area Board of the British Transport Commission, who, as recorded in our September 4 issue, retires from being a part-time member of the British Transport Commission on September 30, was born in 1889 and educated at Eton. During the 1914-18 war he served with the Argyll & Sutherland Highlanders and was mentioned in dispatches. Sir Ian Bolton is Lord Lieutenant of Stirlingshire, and a member of McClelland, Ker & Co., Chartered Accountants at Glasgow. His directorships include those of the Scottish Widows' Fund & Life Assurance Society, the Scottish American Investment Co. Ltd., Coltness Iron Co. Ltd., and British Polar Engines Limited. He is a Past President of the Institute of Accountants & Actuaries in Glasgow; Past President of the Institute of Chartered Accountants of Scotland, President of the Scottish Council of the Boy Scouts Association, County Commissioner of Stirlingshire Boy Scouts, and Lord Dean of Guild, Glasgow University. A part-time member of the B.T.C. since 1947, he was appointed Chairman of the Scottish Area Board as from January 1, 1956. Sir Ian Bolton was awarded the O.B.E. in 1946 and became K.B.E. in 1957. He is succeeded in the B.T.C. by Mr. F. Donachy, a member of the Scottish Area Board.

Mr. Edward A. Bromley, Vice-President (Purchases & Stores), Canadian National Railways, has been elected Chairman of the Purchases & Stores Division of the Association of American Railroads.

Mr. W. Griffiths, District Commercial Manager, Shrewsbury, Western Region, British Railways, has been appointed District Commercial Officer, Swansea.

Mr. G. E. Woodhead has been appointed District Engineer, Manchester, London Midland Region, British Railways. Mr. R. Roscoe becomes District Engineer, Crewe.

Mr. R. W. Clampitt, Stationmaster, York, North Eastern Region, has retired.

Mr. D. Beattie, District Commercial Officer, Norwich, Eastern Region, British Railways, has been appointed District Commercial Manager, Leicester, London Midland Region.

Mr. F. Gibbons, B.A., B.A.I., A.M.I.C.E., District Engineer, Oswestry, Western Region, British Railways, who, as recently recorded, died on August 29, joined the Great Western Railway in 1923, after graduating at Dublin University. Mr. Gibbons served three years as a pupil, before being appointed a junior assistant, at Plymouth, in 1926. In 1929 he moved to Gloucester as an assistant and, in 1931, became Assistant Resident Engineer, Widney Manor, on the quadrupling of the line between Olton and Rowington Junction. He returned to Gloucester in 1933, becoming Assistant District Engineer in 1944, and was appointed District Engineer, Oswestry, in June, 1958. An illustrated biography appeared in our issue of July 11, 1958.

Mr. J. Powell, District Goods Manager, Western Region, British Railways, Paddington, has been appointed District Traffic Superintendent, Gloucester.

Mr. J. C. Gardiner, Traffic Research Officer, Canadian National Railways, has been appointed Assistant Freight Traffic Manager.

Mr. Neal McCusker, Commissioner for Railways, New South Wales Government Railways, who, as recorded in our June 19 issue, has been awarded the C.B.E., entered the Traffic Branch, Department of Railways, in 1923, and by subsequent promotion gained wide experience in that branch. In 1947 he was appointed to a committee to improve the Operating Section of the service. He was seconded to the staff of the Director of Transport & Highways in 1950, and held the position of Executive Officer until September, 1952, when he returned to the Secretariat of the Department of Railways. In July, 1953, Mr. McCusker was appointed Assistant Secretary (Finance & Operations) and, from December, 1954, to April, 1955, he was Deputy Commissioner for Railways during leave of absence through illness of the Commissioner for Railways, Mr. R. Winsor. He became Senior Executive Officer in May, 1955, and was appointed Commissioner for Railways, New South Wales, in September, 1956.

Mr. G. McKay, Chief Engineer, United Automobile Services Limited and Durham District Services Limited, has been appointed Assistant General Manager & Chief Engineer. Mr. D. Gardner, Accountant, has been appointed Secretary of the two companies.

Captain Sir Ian Bolton
Part-Time Member, British Transport Commission who retires on September 30

Mr. Neal McCusker
Commissioner for Railways, New South Wales, awarded the C.B.E.

Mr. W. O. Reynolds

Appointed Planning Officer, London Midland Region, British Railways

Mr. R. J. Hill

Appointed Passenger Commercial Officer, Western Region, British Railways

Mr. B. Seymour

Appointed Goods Commercial Officer, Western Region, British Railways

Mr. W. O. Reynolds, M.B.E., M.Inst.T., Assistant Operating Officer, Euston, London Midland Region, British Railways, who, as recorded in our August 28 issue, has been appointed Planning Officer in that region, began his railway career on the former L.N.E.R. in 1933. He was appointed a Traffic Apprentice in 1936 and, at the conclusion of his training, in 1939, was appointed Assistant to the District Superintendent, Manchester. The following year Mr. Reynolds joined the Royal Engineers in which he served in the transportation branch. A large part of his war service was in the Far East and for his work in Assam and Burma Mr. Reynolds was awarded the M.B.E. in 1944. He was twice Mentioned in Despatches. After demobilisation, in 1946, with the rank of Lt.-Colonel, he was appointed Assistant to the District Superintendent, Stratford, in 1946, and moved to a similar position at Doncaster the following year. He became Assistant District Superintendent, Lincoln, in 1948, and was appointed Assistant Operating Superintendent, Nottingham, in December of the same year. In 1949 Mr. Reynolds became Assistant District Operating Superintendent, Fenchurch Street. He was appointed District Operating Superintendent, Leeds City, in 1954; Assistant (Freight Services), Chief Operating Superintendent's Office, in 1956; Assistant (Passenger Services), Euston, in 1957, and Assistant Operating Officer, Euston, in September, 1958. Reference to Mr. Reynolds's new appointment is made elsewhere in this issue.

Mr. L. H. Cooper has relinquished his position as Chairman & Director, Mond Nickel Co. Ltd., and its subsidiary, Henry Wiggin & Co. Ltd. He is succeeded in these capacities by Mr. G. Archer. Three Managing Directors of Mond Nickel Co. Ltd., are appointed : Mr. I. A. Bailey (Operations), Dr. L. B. Pfeil (Research & Technical) and Mr. J. O. Hitchcock (Commercial). Dr. A. G. Ramsay becomes a director of Henry Wiggin & Co. Ltd., and Mr. F. Dickenson, a director of Mond Nickel Co. Ltd., Mr. F. B. H. Howard-White and Mr. R. A. R. Hill relinquish their positions as Secretary and Comptroller of both companies, and are succeeded respectively by Mr. E. Vaughan and Mr. D. Parry Davies. Mr. C. W. R. Edwards becomes Chief Legal Officer to both companies.

Mr. R. J. Hill, Assistant (Passenger & Parcels) to the Commercial Officer, Paddington, Western Region, British Railways, who, as recently recorded, has been appointed Passenger Commercial Officer, joined the Great Western Railway in the Chester Division in 1917. Mr. Hill served, at various stations, in the Traffic Department, in North Wales and Shropshire. In 1933 he was transferred to the Divisional Superintendent's Office, Chester, as Relief Clerk and later as Divisional Train Runner. In 1941 he moved to the Freight Train Section, Office of the Superintendent of the Line, Paddington, where he took charge of the Traffic Analysis Committee engaged in Freight Train Working research. During the 1939-45 war, Mr. Hill took an active part in the special arrangements for the movement of freight traffic and Government stores trains. After the war he represented the Operating Department on the Chief Commercial Manager's Post-War Planning Committee. He was also Chairman of several Committees of Operating and Motive Power Departments representatives, dealing with schemes for freight train working, trainmen's rostering, engine control and lodging turns. In 1950 he was appointed Head of the Time Table & Special Traffic & Engine Diagramming Section, Superintendent of the Line's Office. In 1955 Mr. Hill was transferred to the Commercial Department, as Assistant (Passenger & Parcels) to the Commercial Officer at Paddington.

Mr. J. K. Lord, Electric Traction Engineer, Manchester, London Road, London Midland Region, British Railways, has been appointed Electric Traction Engineer, Liverpool. He succeeds Mr. R. C. Smith who has retired recently.

Mr. T. S. Roberts, Docks Manager, Middlesbrough & Hartlepool Docks, British Transport Docks, has been appointed Chief Docks Manager, Hull Docks, in succession to Mr. H. L. Hopkins, who will retire on September 30.

Mr. C. D. Edsforth has been appointed Vice-President, Traffic, Canadian Pacific Railway. He succeeds Mr. G. F. Buckingham, who has retired. Mr. J. M. Roberts has been appointed General Traffic Manager in succession to Mr. Edsforth.

Mr. B. Seymour, B.Com., M.Inst.T., Commercial Superintendent, London, Tilbury Southend Line, Eastern Region, British Railways, who, as recently recorded, has been appointed Goods Commercial Officer, Divisional Traffic Manager's Office, London, Western Region, British Railways, joined the Great Western Railway at Cardiff in 1921, and was transferred to Paddington in the Development Department, Chief Goods Manager's Office in 1933. In 1940, he was appointed Acting Goods Agent at Tonypandy. Two years later he became Clerk-in-Charge, Continental Department, Chief Goods Manager's Office. In this capacity, he represented the Great Western Railway and, later, the Western Region at various conferences of the Goods and Passenger Sub-Committees of the International Union of Railways. In January 1949, he was appointed Assistant District Goods Manager, Birmingham, and, in December that year returned to Paddington as Head of the Goods Development Section, Commercial Superintendant's Office. Two years later Mr. Seymour was appointed Assistant District Goods Superintendent, Paddington, and in 1953, became District Goods Manager, Reading. In 1956 Mr. Seymour transferred to the Eastern Region as Commercial Superintendent, London, Tilbury and Southend Line.

We regret to record the death, on September 3, of Mr. Herbert Parry, who, on September 15, was to have succeeded Mr. A. Sams, retiring Assistant General Secretary of the Transport Salaried Staffs' Association. Mr. Parry was born in 1906, and joined the Lancashire & Yorkshire Railway, in the Audit Office, Manchester, at the age of 15. In 1922 he joined the former Railway Clerks Association, and, in 1926, he was transferred to the Goods Department, L.M.S.R. He worked at several stations in the Manchester Area and later moved to the Audit Department in London. Mr. Parry joined the full-time staff of the T.S.S.A., as Chief Clerk, Birmingham Divisional Office, in 1937. He moved to the head office of the T.S.S.A. in 1940. He later became Divisional Secretary, T.S.S.A., for the G.W.R., and subsequently of the London Midland Region, British Railways. In 1953 he was appointed Senior Assistant Secretary, and his duties involved national industrial negotiations, including those with the London

Transport Executive. He was for a number of years in the T.S.S.A. delegation to the T.U.C.

The Late Sir William Wood

A memorial service to the late Sir William Valentine Wood, K.B.E., Member of the British Transport Commission, 1947-53, was held at St. Pancras Parish Church, Euston Road, London, on September 7. The service was conducted by the Reverend J. Borrill, who also gave the address. He was assisted by Reverend J. E. Wensley. The lesson was read by Sir John Benstead, Deputy Chairman, British Transport Commission. In addition to family mourners, the following were among those present:—

Members of the British Transport Commission.

General Sir Brian Robertson, Sir John Benstead, Mr. K. W. C. Grand.

Sir John Elliot, Sir Reginald Wilson and Mr. John Ratter were unable to attend.

General Staff of the Commission.

Messrs. M. H. B. Gilmour, T. H. Hollingsworth, R. C. Bond, J. H. Brebner, D. S. M. Barrie, F. Grundy, A. A. Harrison, J. O'Neill, J. S. Campbell.

Former Member of the B.T.C.

Mr. F. A. Pope.

Lord Hurcomb and Sir Michael Barrington-Ward were unable to attend.

Formerly B.T.C.

Messrs. F. Gilbert, S. E. Parkhouse, J. R. Pike.

London Midland Area Board.

Lord Rusholme, Sir Francis Glyn, Mr. T. Howard-Williams, Sir R. Burrows.

London Midland Region Officers.

Messrs. A. J. Pearson (also representing Mr. David Blee), E. W. Arkle, S. H. Gould, A. B. McLeod, G. J. Norton (representing Mr. H. Aidley), M. G. E. Lambert (represented by Mr. L. A. Metcalfe), J. S. S. Davis (representing Mr. E. G. Brentnall), T. C. Byrom (represented by Mr. L. A. Metcalfe), A. E. Dent, G. E. Graves Peirce, J. K. Abson, J. B. Chadwick, C. L. Jolliffe, E. W. E. Preece (representing F. Marsden).

Former London Midland Region Officers.

Messrs. R. A. Riddles, T. W. Royle, Sir William Stanier, Messrs. A. W. Norman (also representing Retired Railway Officers' Society), G. R. Smith, S. J. Symes, W. P. Bradbury, T. E. Argile, W. K. Wallace, F. C. Howard.

Eastern Region.

Mr. S. G. Hearn (also representing H. C. Johnson and Sir C. H. Newton).

North Eastern.

Mr. L. M. Sayers (also representing H. A. Short).

Scottish Region.

Mr. R. S. Boyd (representing Sir Ian Bolton and Mr. J. Ness.)

Southern Region.

Mr. D. McKenna (representing C. P. Hopkins).

London Transport Executive.

Mr. A. B. B. Valentine (also representing Institute of Transport), Mr. L. C. Hawkins.

Railway Clearing House.

Mr. W. S. Cutler.

B.T.C. Hotels & Catering.

Mr. T. H. Baker (representing Mr. F. G. Hole).

Others present.

Dr. Baker (representing Sir Harold Bellman, Chairman of the Abbey National Building Society), Major E. H. Clokey (representing London Ulster Association and Catholic College, Belfast, Old Boys), Messrs. G. F. Sinclair (Board of Management, British Road Services), G. W. Quick Smith (representing Chairman of British Road Services), F. D. N. Harding (Pullman Car Company), Sir Robert Letch (British Transport Docks), A. E. Newbiggin (representing Secretary A.S.L.E.F.), W. V. Morland (International Union of Public Transport), C. F. Klapper (*Modern Transport*), B. W. C. Cooke (*The Railway Gazette*).

Appreciation

Sir Harold Hartley writes in *The Times*:—

As the last survivor of Stamp's unholy trinity, as we were called, Sir William Wood, Sir Ernest Lemon and myself, may I add my tribute to Wood's memory. We were a happy little team in the days before the war, thanks to Stamp's leadership and to the eager unselfish spirit in which my two colleagues brought their very different but complementary experience to bear on the modernisation of the L.M.S.R. after amalgamation.

Wood had a unique knowledge of the financial aspect of every detail of its commercial and operating problems. He had a fine analytical brain and nothing escaped him. At the same time he had an uncommon grasp for anyone with an accountant's training of the many physical problems involved in railway working. In my first week at Euston he gave me a sheet of foolscap on which he had set down in his clear, spidery writing his view of the main engineering problems with which I should be faced, and that, together with the report of Lemon's "lightning committee" later in the year, forecast our work together over the next 10 years.

Incidentally, I am sure that Wood would have been the first to quarrel with the description of his old chief in *The Times* of August 27 as "a born journalist . . . and an able administrator." That surely does but scant justice to Stamp's broad grasp of the economic problems facing Britain over the years from his early books on British incomes and property and on taxation, ending with his great service to the Government as an economic adviser before and during the war.

Wood's knowledge and grasp of railway statistics was an invaluable help to Stamp when he joined the L.M.S.R. and the little book they wrote together for the Home University Library, *Railways, 1825-1928*, is unrivalled as a clear, concise picture of the working of the railways after the amalgamation of 1923. Under his quiet, unassuming manner Wood had the fire of the Ulsterman which would blaze forth if he thought injustice had been done or when he was fighting, as he so often was, for the future of the railways. I know I am speaking for many of his friends in saying how much we owed to his never failing loyal and effective support at difficult moments.

Mr. R. H. C. Hackshaw who retired from the position of Operating Superintendent, Transportation Department, Bulawayo, Rhodesia Railways, as recorded in our April 17 issue, to be appointed Agent for Rhodesia Railways, Lourenco Marques, was born in London in 1904. He was educated at Haileybury College and Crystal Palace School of Engineering. For five-and-a-half years Mr. Hackshaw was a pupil and an assistant engineer with Messrs. Douglas Fox & Partners. He was appointed Assistant Road Transport Officer, Road Motor Services, Rhodesia Railways, and was attached, for five months, to the Road Motor Department, London Midland & Scottish Railway, before taking up his appointment at Bulawayo, in 1929. He was appointed Road Transport Officer in 1937. Mr. Hackshaw was on active service from 1939 to 1945, and returned to the Rhodesia Railways, at Broken Hill, as Outdoor Assistant to the District Superintendent. He was appointed Assistant Superintendent (Port Working) in 1946. In 1949 he was transferred to Bulawayo, and, after acting as District Superintendent on several occasions, was appointed to that position in 1952. Early in 1953 he was transferred, in the same grade, to Broken Hill, and in 1954, returned to Bulawayo as Operating Superintendent. Since then he has acted as Assistant Chief Superintendent on a number of occasions.

We regret to record the death, on August 29, of Mr. F. G. Crabb, Commercial Officer, Eastern Region, British Railways, since 1957.

We regret to record the death, on August 29, of Mr. Frank Gibbons, District Engineer, Central Wales District, Western Region, British Railways.

Mr. K. Wright, Traffic Agent, Tyne Dock, North Eastern Region, British Railways, has been appointed Passenger & Parcels Agent Sunderland.

Mr. C. L. Pyle, Goods Agent, Wishaw, Scottish Region, British Railways, has been appointed Goods Agent, Grangemouth.

Mr. H. C. Horsup, Secretary, Ransomes Rapier Limited, will retire on September 30. He will be succeeded by Mr. G. N. Rodgers.

Mr. J. W. Ferguson, formerly Chief Mechanical Engineer, Traction Division, Brush Electrical Engineering Co. Ltd., has been appointed Chief Engineer, Locomotive Division, Tulloch Limited, Rhodes, New South Wales.

Rural Bus Committee

The Minister of Transport & Civil Aviation, announces that membership of the Committee on Rural Bus Services has now been completed. The members, who have been invited to serve as individuals rather than as representatives of particular organisations, will include a Chairman of Traffic Commissioners, a bus operator, a business man, members of rural communities, including representatives from Scotland and Wales, a trade unionist and an accountant. The members are Professor D. T. Jack, Mr. T. W. Benbow, Dame Frances Farrer, Mr. C. I. R. Hutton, Mr. W. T. James, Colonel A. T. Maxwell, Colonel Sir James M. Miller, Mr. S. W. Nelson, Mr. H. R. Nicholas, Mr. E. B. Powley, Lady Riddell-Webster, Mr. F. W. Ward. Professor Jack has been appointed Chairman of the Committee. The Secretary of the Committee will be Mr. J. M. Moore.

B.R.S. Board Changes

The board of management of British Road Services is to be reconstituted in consequence of the appointments of Major-General G. N. Russell as a member of the British Transport Commission and of Mr. T. G. Gibb as General Manager of British Road Services. From October 1 the members of the board will be: Mr. T. G. Gibb (General Manager, to be also Chairman with special responsibility for major policy on staff and labour questions); Mr. G. F. Sinclair (Member, will become Deputy General Manager and Deputy Chairman, with responsibility for technical services); Mr. Harold Elliott (Chief Traffic Manager), to be a member of the board in charge of traffic and to continue as Chief Traffic Manager); Mr. J. B. Garrett (continues as a part-time member in an advisory capacity); Mr. C. Barrington, to be a part-time member as from January 1, 1960, when he will become Chairman of the Atlantic Steam Navigation Co. Ltd.) Changes in the boards of B.R.S. Limited companies from October 1 also are announced. Mr. C. Barrington is to be Chairman of B.R.S. (Pickfords) Limited, and Mr. Elliott will be appointed to the boards of British Road Services Limited, and B.R.S. (Parcels) Limited; Mr. J. B. Garrett will be Chairman of B.R.S. (Meat Haulage) Limited, and Mr. E. G. Marsden Chairman of Anglo Continental Container Services (London) Limited, and Anglo Continental Container Services (Belfast) Limited in succession to Mr. D. H. Foulds, who will be appointed to the board of B.R.S. (Pickfords) Limited.

NEW EQUIPMENT AND PROCESSES

New Cutting Equipment

THREE innovations in the British oxy/fuel gas cutting field will shortly become available. They are a universal torch for use with various fuel gases, a machine-operated counterpart of the torch and a regulator.

The new products are being made in Britain as a result of an agreement concluded between the British manufacturer and the Harris Calorific Company of Ohio, U.S.A., whereby latest designs of the American company will become available for production in this country. As a further result of the agreement, the British company will now enter the export market and will welcome overseas enquiries.

The Torch

The cutting torch (illustrated above) will be produced in a three-model range known as the 62 series, the only difference between the individual models being the injector and change of cutting nozzle. Model 62-2 uses dissolved acetylene (high, medium, or low pressure); Model 62-2F, propane, pyrogas, or butane; Model 62-2N low-pressure acetylene or coal gas. Each nozzle or tip will be visually distinguishable. A fourth nozzle design is available for gouging with propane. A machine torch counterpart of Model 62-2 will also be produced to operate on any of the gases mentioned, using the appropriate nozzle, at pressures of less than 1 lb. per sq. in. This torch will be known as Model 98-2.

The advantage claimed for all three models is economy of operating time and therefore of cost. Special advantages claimed for the Model 62-2F, fuelled by low-pressure propane and using the Model 70 regulator, are that it starts and cuts as fast as is possible using any other gas—right pressure is always and instantly available; it easily cuts scaly, rusty material; saves up to 70 per cent of fuel gas cost; needs neither trimming of fuel nor of oxygen valves; can be easily adapted for gouging a surface suitable for arc-welding without further preparation, and using propane consumes equal or even less oxygen than would be necessary if other fuels were used.

Extremely robust construction gives long life under tough conditions. Also, distance from work is not as critical as it is with other torches and two of the chief hazards to nozzles—heat and impact—are accordingly overcome. The copper outer on the NFF Series has a wall thickness designed for long life and an easily-replaceable bronze inner fluted to give almost an annulus flame.

The Regulator

The 77N Multi-State Gaugeless Regulator (illustrated below) delivers a constant working pressure regardless of incoming pressure and has a minimum variation from flow to non-flow. Instead of the usual protruding pressure gauges which invite damage, there is a "pop-up" cylinder contents indicator, graduated in "steps," and a working pressure indicator with pressures impressed in the bonnet. Sintered metal is used for gas filtration, nylon for the intermediate seat, and neoprene for the low-pressure diaphragm and seat. There is a very high degree of safety control: a self-sealing, spring-loaded poppet-type safety valve protects the intermediate stage and a working pressure safety valve protects the low-pressure stage. Although the intermediate pressure chamber operates at approximately 250 lb. per sq. in. the diaphragm is designed to vent at 1,000 lb. per sq. in. through a relief orifice. A venting disc is also incorporated on the low-pressure side. Thus, no matter what the operating circumstances, both high- and low-pressure chambers are completely protected.

Fuel cylinder pressure (2,000 lb. per sq. in.) is automatically reduced by 90 per cent on entering the first stage controlled by a 1-in. metallic non-flammable diaphragm. Because of this, the regulator will stand much misuse. The ratio between seating area and diaphragm is only 10: 1 and this ratio reduces the shock absorbed by the seat when the cylinder valve is opened.

Cutomation System

The Cutomation System, which increases cutting speeds up to 50 per cent and provides a fast starting pre-heat flame, is for propane operation on profile machines.

The increased speeds result from use of the convergent - divergent orifice — known in theory for many years and now successfully adapted. Briefly, the cutting oxygen stream

expands within the nozzle and, flowing at supersonic speed, oxidises the metal in a narrower kerf, reduces the amount of metal lost, and effects faster cutting.

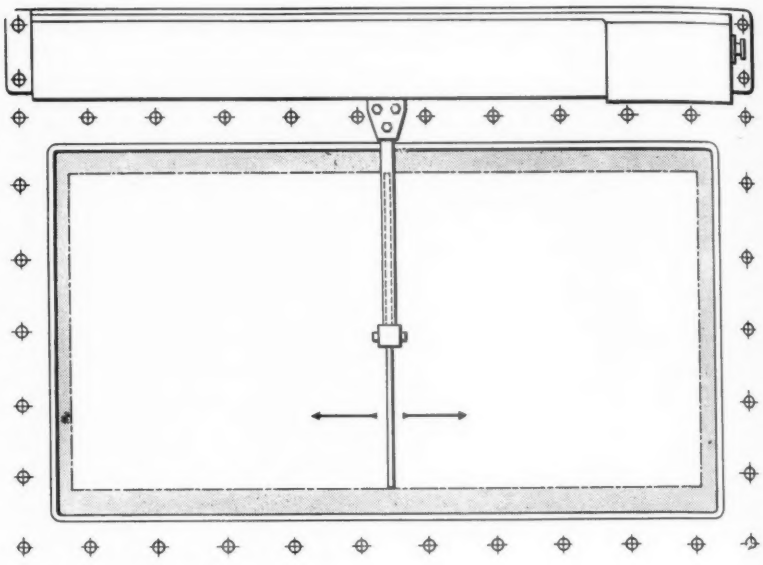
Once cutting has commenced, the high-temperature flame required for starting becomes superfluous and is automatically reduced. Pre-heat gases are reduced up to 80 per cent; overall oxygen consumption by as much as 20 per cent.

Using propane, the cut is fast and of high quality. Less slag forms, and there is no burning or rolling of top ends of cut.

Economic use of supply is ensured by the Model 70 regulator and a three-hose injector-type torch (third illustration).

An additional regulator, the 48 DC (fourth illustration), ensures control of the size of the pre-heat flame by varying oxygen pressure. This regulator, one part by-pass and the other manually-controlled, will ensure a 75 per cent. saving in pre-heat gases.

Further details of all this equipment can be obtained from the British manufacturer, British Industrial Gases Limited, 700, Great Cambridge Road, Enfield, Middlesex.



Heavy-Duty Window Wiper

THE Straight-Line heavy-duty window wiper has been developed for use on ships, diesel and electric locomotives, heavy transport vehicles, and equipment such as cranes and excavators. Unlike the pendulum type of wiper, the rubber-faced blade travels across the window from side to side in a straight line.

The following advantages are claimed for this wiper:—

Great strength and a capacity to withstand large side forces without derangement; a clean sweep right up to the edges of the glass, and side-parking, which gives clear vision in fine weather.

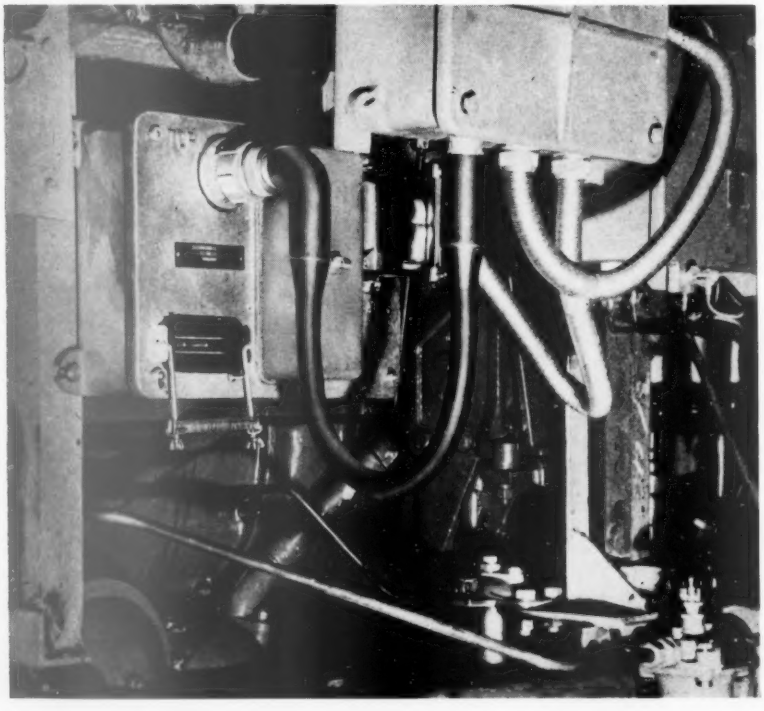
The wiper arm and blade is cantilever-mounted on a sliding carriage fitted with rubber-tyre rollers. It runs in roller tracks formed in a stainless steel casing. The carriage is carried by endless belt driven by an electric motor. A removable front cover permits access to the mechanism.

Electric supply can be any voltage a.c. or d.c. Power consumption under adverse conditions is about 100 W. Maximum linear speed of the blade is about 320 ft. per min. corresponding to 80 strokes per min. on a 4-ft. length of glass.

All internal parts are of stainless steel or other material impervious to corrosion by sea water. Despite this, water can be prevented from entering by a rubber seal which can be supplied extra and is recommended if the wiper is mounted upside down beneath the window. The arm slot can be fitted with electric heating to prevent icing in arctic conditions.

Applications for the wiper should be accompanied by a drawing of the window on which it is to be used, showing space available above and below. Particulars of electric supply and whether fixed or variable wiping speed is required should also be given.

Further details can be obtained from Wynstruments Limited, Staverton Aerodrome, Gloucester.



Soluble Cutting Oils

DROMUS soluble cutting oils constitute a new range containing an improved coupling agent. This facilitates the formation of a stable emulsion when the oil is mixed with cold water, hard or soft, with the result that the oils do not possess the odour of disinfectant normally associated with this type of lubricant. They are, therefore, more acceptable, particularly to women operators, and less liable to cause skin irritation.

These grades possess the same stability and anti-corrosion properties of the manufacturer's original grades. Dromus Oil B forms a particularly white opaque emulsion.

Further details, contained in Technical Bulletin No. 2, can be obtained from the Technical Department of Shell-Mex & B.P. Ltd., Shell-Mex House, London, W.C.2.

Plug and Cable Assembly

A SPECIAL-PURPOSE electrical plug and cable assembly has been designed to supply electrical current for heater fan motor and heater controls on new British Railways multiple-unit diesel trains.

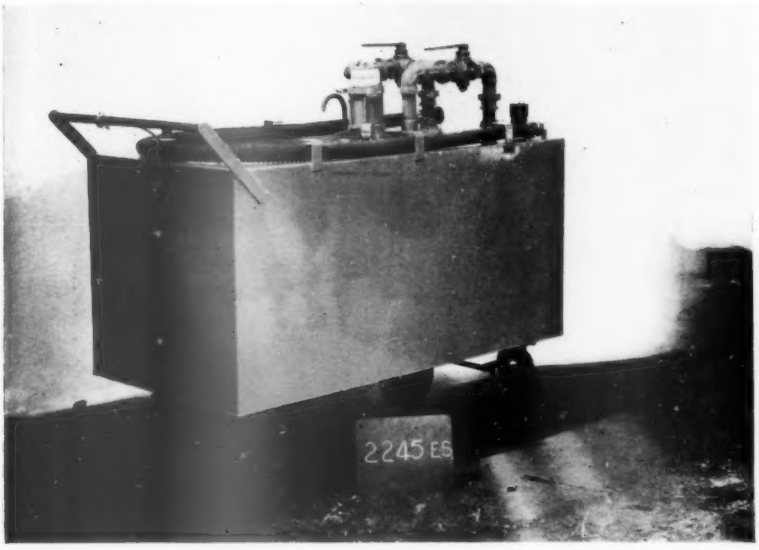
For additional robustness and weather proofing, the cable is moulded to the connector, which is of multi-contact type, each plug contact blade being gripped by a series of spring banks to ensure clear and positive contact.

Further details can be obtained from Modern Acoustics Limited, Manor Way, Boreham Wood, Herts.

Transportable Waste-oil Unit

A TRANSPORTABLE waste-oil unit known as Model 2245 ES has been designed for easier servicing of diesel railway locomotives. Its main advantage is that, apart from requiring a compressed air supply, it is completely self-contained.

The unit consists of a 150-gal. tank



on which are two change-over cocks, an air-operated diaphragm pump, and a 10-ft. length of 1¼-in. oil hose fitted with an oil-tight coupling. Via this, the pump withdraws oil from the locomotive and, when the cocks are operated, waste can be pumped out of the unit into a bulk storage tank. A 30-ft. length of ¼-in. air hose enables the pump to be coupled to the air point.

The unit is mounted on two 10-in. dia. castor-type rubber-tyre wheels and two 10-in. bracket-type rubber-brake wheels. Brakes are designed to be normally operating, except when released manually. Overall dimensions are as follow: height, 4 ft. 6 in.; length, 5 ft. 6 in.; width, 2 ft. 6 in. Price is £243.

Further details can be obtained from the manufacturer, C. C. Wakefield & Co. Ltd., 46, Grosvenor Street, London, W.1.

Greasing and Spraying Gun

THE Packa Handi-Power Unit is a portable high-pressure greasing and spraying unit patented by the Packer Pressure Equipment Co. Ltd., and manufactured for that company by the Engineering Division of the Tilley Lamp Co. Ltd., which company is also authorised to act as a distributing agent for the equipment.

The unit is claimed to revolutionise high-pressure greasing. Weighing slightly over 15 lb., it is completely self-contained, portable, operates under its own power (pressure) and supplies 14,800 shots of grease, each of 1.25 cc., without re-charging. Its mobility is such that, during a recent demonstration, a greaser was easily able to climb a 100-ft. crane and grease the pulley wheels at the top of the jib.

The unit deals with tight or normal bearings—although the container is pumped to only 40 lb. per sq. in., over 12,000 lb. per sq. in. is developed on the nozzle end of the gun. This is operated by one hand and has a pistol grip of such sensitivity that its "feel" enables the operator to detect unusual conditions such as blocked bearings. He can also "feel" the grease actually entering the bearing and is thus able to judge whether or not the job has been properly done.

A pump can be supplied extra for refilling the container without releasing pressure and without the grease coming into contact with the operator or with the atmosphere. These factors ensure completely uncontaminated grease. Refill and greasing unit can deal with all types of grease and heavy lubricating oils. Refilling is completed in a matter of seconds.

The pistol is held in a special holster when not in use, leaving the operator's hands free. Special skids act as a protection to the container and as a support for mounting on the operator's back. They can also be used for dragging the kit round on any type of ground.

The unit can be quickly and easily converted for use as a blowlamp or spray unit.

Retail price is £16 16s. Further details can be obtained from the manufacturer, the Tilley Lamp Co. Ltd., Colindale Avenue, Hendon, London, N.W.9.

New Use for Lorry Loader

THE Hiab lorry loader, already known for its application to lighting-column erection and pipe-laying and for its primary purpose of loading and off-loading the vehicle to which it is fitted, is now in use on the Southern Region of British Railways in a new capacity and with a new "parent" vehicle.

During recent work on overhead electrification of sidings and marshalling yards, equipment was required capable of lifting galvanised steel poles from wagons and erecting them in cored holes located at an average of 6 ft. 6 in. from side of track. The poles ranged in length up to 33 ft. and in weight up to 1,000 lb. and had to be lowered cleanly to avoid damage to the galvanising. This involved holding the poles within a maximum of 7 in. of vertical.

The contractors, Clough, Smith & Co. Ltd., felt that the Hiab lorry loader might solve the problem at a comparatively low capital cost. Nevertheless, the difficulty of access which ruled out the use of a mobile crane applied equally to the use of a loader mounted conventionally on a lorry. It was decided to mount the loader on a rail wagon and, to discuss this, an approach was made to the sole agents for the 2-ton capacity model, George Cohen Sons & Co. Ltd.

The resulting equipment consists of a standard 2-ton loader mounted at one end of a conventional flat wagon, the hydraulic pump being powered by a Petter AVA-2 diesel engine. Thus mounted, the loader provided a height of lift of 23 ft. while having an overall height when in the travelling position that was just within the standard gauge.

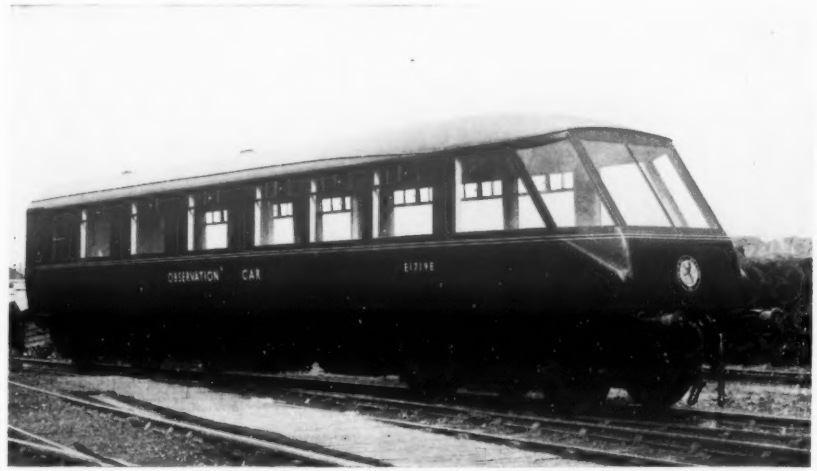
The only modifications made to the loader were an increase in slewing range from the standard 180 deg. to 359 deg. and removal of the hydraulic jacks normally fitted to eliminate excessive strain on the chassis of a road vehicle. Stability was provided by ballasting the truck with between 3 and 4 tons, an amount sufficient to keep maximum deflection under full load to within half an inch.

The short runs, variations in site conditions, and necessity of scheduling work to fit times when the tracks were not in use make it impossible to arrive at output figures with any general significance. Nevertheless, the contractors are satisfied that the equipment is proving faster than any alternative available for the work. Only one operator is required, and the delicacy of control available eliminates the risk of damage to the poles through scoring by the concrete at the lip of the holes.

The address of the George Cohen 600 Group Limited, is Wood Lane, London, W.12.

Rebuilt Observation Cars for West Highland Line, Scottish Region

Observation car, before reconstruction, crossing Lochy Viaduct, near Fort William, British Railways, Scottish Region



Re-designed observation car working on Glasgow-Fort William-Mallaig service, showing increased window space.

View forward, showing movable arm chairs

Re-designed observation window at rear end

Scottish Region Locomotive and Rolling Stock Display

Sir Brian Robertson on railway modernisation in Scotland

Sir Brian Robertson, Chairman of the British Transport Commission, was present at a press preview on September 1, of the locomotive and rolling stock display which British Railways, Scottish Region, is staging at Glasgow Central Station in support of the Scottish Industries Exhibition which opened on September 3.

After a tour of the display, Sir Brian Robertson stated that he felt justified in claiming that in the light of known difficulties the Commission was adopting a very bold forward policy in Scotland. Efforts were being intensified to modernise this part of the system and show faith in Scotland's economic future.

Glasgow Suburban Electrification

He mentioned particularly the electrification of the suburban services in Glasgow, the first stage of which would come into operation next year and said that this great project had its origin in certain discussions with the authorities in Glasgow some four years ago. He pointed out then that it would be very expensive and could only be justified on the assumption that the services, once provided, would be fully used. He hoped passengers would like the colour of the rolling stock (Caledonian Blue) which was to be used, and stated that there would be no better rolling stock on any suburban services in Britain and he doubted if there were any as good on any suburban service anywhere else. Further extension of this electrification, he added, would depend upon the encouragement received from the people of Glasgow and surrounding districts. By making full use of the modernised suburban railway network Glasgow could do more to solve its traffic problem than by any other single means.

Announcing the Commission's decision to go ahead with its order for a new ship to carry passengers and vehicles between Stranraer and Larne, Sir Brian Robertson said that when the service began to operate in two years' time the aim would be to give an all-the-year-round service, and if the traffic warranted it they would be prepared to operate two round trips a day throughout the year. It would be a very expensive vessel and he hoped that the service would be well supported otherwise the ship would have to be moved away to some other service elsewhere.

The new ship would be built on the Clyde. The Clyde yards had in hand at present five vessels for the shipping services of the Commission and its subsidiary organisations, apart from orders for harbour craft. The Commission, he stated, was a very big customer of Scottish industry. "When industry in Scotland gives us its business, particularly freight business, it is casting its bread on the waters."

The Commission had associated itself closely with the Scottish Industries Exhibition and he wished it every success. He was confident that it would bring more business to Scotland, and thereby, he hoped, to the Commission's services by road, rail, and sea.

Retirement of Sir Ian Bolton

Finally Sir Brian Robertson announced the forthcoming retirement at the end of September of Sir Ian Bolton, who had been a Member of the Commission since 1947. He said that he was only able to visit Scotland occasionally. The lack of frequency of his visits did not imply any lack of interest of the undertaking in Scotland, but was rather evidence of the confidence which he and his colleagues on the Commission reposed in those who were in charge of its interests. He referred particularly to the Scottish Area Board, which had done excellent work since its creation in 1955 under the chairmanship of Sir Ian Bolton. He expressed his great appreciation for the remarkably fine work which he had done on behalf of the Commission and those who used the Commission's services in Scotland. His place as Chairman of the Scottish Area Board would be taken by Mr. Donald Cameron of Lochiel, who had been a Member of the Commission for the past five years and of the Board since its creation.

New Station for Harlow New Town

British Railways, Eastern Region, is to build a new station to cater for the ever-increasing population of the new town of Harlow, Essex.

Only a few years ago, there were just over 3,000 inhabitants who were adequately served by the two small railway stations in the district, Harlow and Burnt Mill. The present population is 50,000, and it is expected to reach 80,000. Neither station was built to absorb such a sudden expansion of population successfully, and so plans for the new station were put in hand. Of the two stations, Burnt Mill had the better situation in the layout of the growing estates, and the new station, Harlow Town, is now being built on that site. It is expected to be completed by early next year. The other station at Harlow will be re-named Harlow Mill.

Construction of Station

Harlow Town Station will have light-grey flint-lime brickwork on the external walls, together with large areas of glass. Approached from an access road and forecourt, with future parking space for 120 motor-cars, there will be a 50 ft. x 40 ft. x 17 ft. high glass-walled concourse.

The booking hall will have tiled floors, glass mosaic dadoes and varnished timber ceilings. It will contain a mechanised ticket office, public telephones, stationer's and tobacconist's kiosks and Stationmaster's office. The inquiry and parcels offices (with a large parcels yard beyond) will be on the east side and, on the west, there will be cycle storage for 150 cycles.

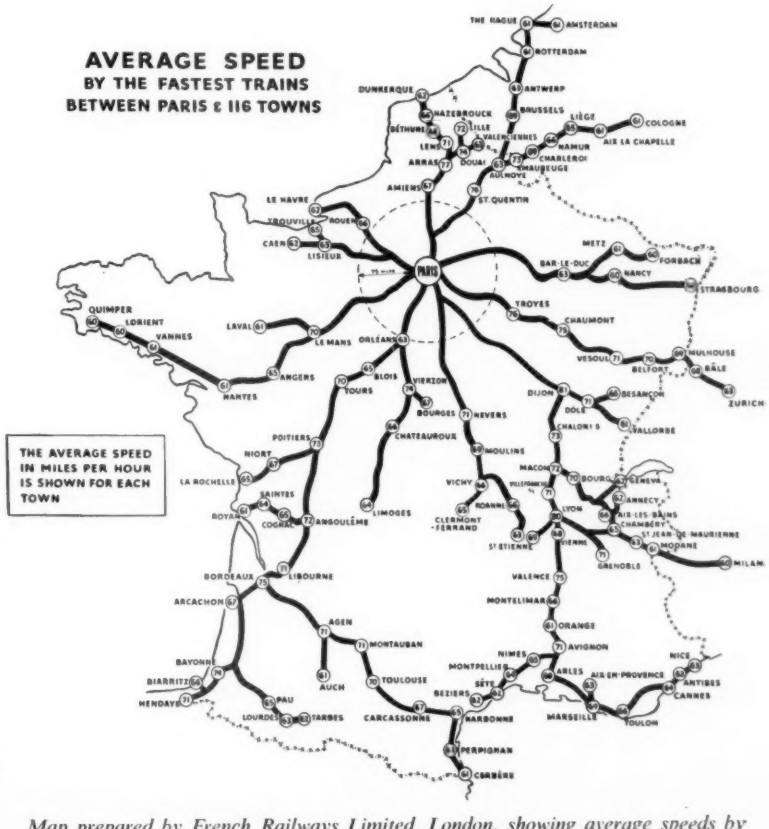
From the concourse, there will be a covered prestressed concrete overbridge for passengers and parcels giving access to the two island platforms. The public waiting rooms will be on the bridge, but each of the 810-ft.-long platforms will also have enclosed waiting shelters.

Heating throughout will be by hot water pipes embedded in the floor. Automatic train indicators and a public address system will also be installed.

Parcels and Luggage Facilities

The station has been planned so that parcels and baggage are not handled in the areas used by passengers. The lift towers

Fast Passenger Transits by S.N.C.F.



Map prepared by French Railways Limited, London, showing average speeds by the fastest trains between Paris and 116 *towns*

will contain three parcels lifts to serve the overbridge, they will also be available for invalids unable to use the stairs.

There will be four tracks through the new station, instead of the present two, consisting of an up and down main line and loop lines in each direction. Provision has also been made to enable the loops to be extended to form carriage standage if this facility is required in the future. On the up side, there will be a siding for dealing with parcels, newspaper, and mail traffic.

Re-signalling

This new track layout will mean extensive signalling alterations. The existing semaphore signals will be replaced by searchlight type colour-light signals controlled by continuous track circuiting on all lines. A new signalbox will be built at Harlow Mill to house a route-setting control panel covering the whole area. Existing signalboxes at Burnt Mill and Harlow will be abolished; the remote control of the layout at the new Harlow Town Station being operated by electronic equipment.

Already completed by British Railways for the County authorities is a new bridge on the London side of the station to carry a by-pass road over the railway lines. This has enabled the old level crossing to be closed and the inadequate by-pass overbridge to be demolished.

Australian Railway Officers Visit U.S.A. and Europe

As recorded briefly in our last week's issue, a visit to America and Europe is being made by two senior Victorian Railways officers to investigate developments in the co-ordinated rail and road transportation of freight. The officers are Mr. A. C. Brown, Outdoor Assistant to the Chief Traffic Manager, and Mr. H. V. Chapman, Rolling Stock Branch Technical Engineer. Their tour, which is intended to take four months, began with attendance at a conference in the U.S.A. when the American trucking associations and the automotive industry were joined by a delegation from the Australian Haulier's Federation.

In Britain and other European countries, a thorough examination will be made of railway freight operations and terminal layouts, particularly the use of containers for manufactured goods and the economical transportation by rail of loaded road units for raw materials, and so on.

Examination of Diesel Operation

Another senior officer of Victorian Railways, Mr. L. C. Rolls, of the Rolling Stock Branch, is visiting the U.S.A. to make a brief survey of the operations of several railroads there, and to inspect the plant of General Motors, La Grange, Illinois, suppliers of power units for V. R. diesel-electric locomotives.

Next, Mr. Rolls will examine the operation and maintenance of diesel-hydraulic V60 locomotives on the German Federal Railways. The works of engine and transmission component manufacturers will be included in a detailed study of diesel-hydraulic working in Germany.

Victorian Railways has let contracts for the construction and supply of 25 Tulloch-type 660 h.p. diesel-hydraulic locomotives, similar to the German V 60, design, to be used mainly for shunting work in Melbourne and other marshalling yards. Delivery of the first of these locomotives, to be known as " W " class, is expected in November.

D.S.G. Winter Sleeping Car Services

Services to be operated by the Deutsche Schlafwagen- und Speisewagen-Gesellschaft G.m.b.H. (D.S.G.) during the period from October 4 to May 28, 1960, include the " Saphir " T.E.E. refreshment cars in diesel trains between Ostend and Cologne, connecting with the morning service from Victoria via Dover to Ostend and the afternoon sailing from Ostend in the reverse direction. This gives a day service between London and Cologne, with connections to and from the Ruhr and Bonn and Frankfort/Main. Departure from Victoria is at 9 a.m. with arrival at Cologne HBF. at 7.51 p.m.; westbound, Cologne is left at 10.22 a.m., with arrival at Victoria at 7.46 p.m.

The " Saphir " and the " Ostend-Vienna Express," which runs in conjunction with the same Dover-Ostend sailings, but with later arrivals at and departures from Cologne, and the day service from and to Liverpool Street via the Hook of Holland, connect with D.S.G. sleeping-car services to and from destinations in Western and Eastern Germany, Switzerland, and Austria. Most of these include both first and second class accommodation. In some cases the first class accommodation consists of single-berth compartments only.

Places served by connecting sleeping cars from and to Cologne, include Leipzig, Munich, Hamburg, Basle, Zurich, Chur, Flensburg, Kiel, Interlaken, Constance and Nuremberg.

Staff and Labour Matters

Strike Threat over Railway Policy

Leaders of 23,000 railwaymen in the north-west have called for a national railway strike unless the British Transport Commission stops closing stations and branch lines and giving railway modernisation work to outside contractors.

A resolution approved by officials of the Manchester District Council of the N.U.R., representing members in the area between Southport and Matlock, called on national leaders of the union to pass on the strike threat to the B.T.C. It declared: " The time for moderation is past. We call upon our national leaders to mobilise the membership now for action in a really determined fight for work, wages, and conditions."

Contracts and Tenders

Contract for second stage of Bornu extension, Nigerian Railway Corporation

The Nigerian Railway Corporation has awarded a contract to Strabag (Nigeria) Limited, Hochtief AG, and Philipp Holzmann AG, for the construction of the second stage of the Bornu extension, from Bauchi to Combe, a distance of about 100 miles. The contract covers the construction of the formation, bridges, culverts, and ancillary works, and their maintenance for an agreed period, at a cost of some £1,767,000. The work will commence very shortly and is expected to be complete by the end of 1961.

General Motors Overseas Operations has received an order from the Yugoslav Railways for 20 diesel-electric standard-gauge locomotives of 1,950 b.h.p., running on two three-axle bogies, for service principally on the lines running from Zagret to the Adriatic coast at Susak and Split.

British Railways, London Midland Region, has placed the following contracts:—

Pressure Piling Co. (Northern) Ltd.: piling for reconstruction of Manchester London Road Station

Vickers Armstrongs (Shipbuilders) Limited, on behalf of the British Transport Commission, Docks Division: construction, delivery, and installation of steel floating caisson

Kyle Stewart (Contractors) Limited: renewal of roof coverings at Manchester London Road Passenger Station

Butterley Co. Ltd.: part reconstruction of bridge No. 4 on Manchester-Sheffield line

A. V. Shenton Limited: main office block and amenities at Stoke-on-Trent Freight Terminal

Young, Austen & Young Limited: installation of extract ventilating plant at Liverpool, James Street Station and Birkenhead, Shore Road Power Station

D. Lynch & Company: demolition of existing station buildings at Coventry Station

Seddon (Stoke) Limited: erection of new offices and amenities at Crewe District Electric Depot.

British Railways, North Eastern Region, has placed the following contracts:—

Plasser Railway Machinery: two tamping machines, and two lifting and levelling machines

Richard Costain Limited: new office building at Middlesbrough Passenger Station for the Traffic Manager, Tees-side

Cambrian Wagon & Engineering Co. Ltd.: seven storage tanks at Gateshead Motive Power Depot

Harrison & Doughty Limited: repair of an electrically operated turntable at York Motive Power Depot

Wm. Birch & Sons Ltd.: diversion of a sewer at York Dringhouses up yard.

The Special Register Information Service Export Services Branch, Board of Trade, has received calls for tenders as follows:

From India:

Technical collaboration for the supply and progressive manufacture of 42 25-kV. 50-cycle a.c. freight locomotives in India in the Chittaranjan Locomotive Works, West Bengal.

The issuing authority is the Ministry of Railways (Railway Board), Government of India. The closing date is November 9, 1959. The tender documents excluding drawings and specifications can be had on payment from any of the following offices: Research, Design & Standardisation Organisation, Ministry of Railways, " F " Block, Connaught Place, New Delhi.

The Director General, India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3.

Director, India Supply Mission, 2536, Massachusetts Avenue, N.W., Washington 8, D.C.

Tenders should be addressed to Qurban Singh, Director, Railway Stores, Railway Board, State Entry Road, New Delhi, 2. The Board of Trade reference is ESB/20414/59.

From Formosa:

17 passenger coaches, 3-ft. 6-in. gauge

28 *tonnes* maximum tare weight, in dismantled state.

The issuing authority and address to which bids should be sent is the Central Trust of China, Purchasing Department, 68, Yen Ping Nan Road, Taipei, Taiwan, (Formosa). The tender No. is US-622A. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is September 24, 1959. The Board of Trade reference is ESB/20501/59/ICA.

110 wheel and axle assemblies for goods wagons; brake riggings and accessory parts; couplers, draft gear, and parts; air-brake equipment and parts; sliding doors complete with door lintels; and tether rings and axlebox guides
270 steel channels
293 steel angles
252 steel plates
51 steel bars.

The issuing authority and address to which bids should be sent is the Central Trust for China, Purchasing Department, 68, Yen Ping Nan Road, Taipei, Taiwan (Formosa). The tender No. is US-622C. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is September 24, 1959. The Board of Trade reference is ESB/20502/59/ICA.

From Ceylon:

3 track laying tractors complete with spare parts.

The issuing authority and address to which bids should be sent is the Chairman, Tender Board, Ministry of Works, P.O. Box 1436, Colombo 1, Ceylon. The tender No. is DLF-22. This purchase will be financed by the Development Loan Fund of the United States Government. The closing date is October 21, 1959. The Board of Trade reference is ESB/20712/59/ICA.

From Pakistan:

2,490 ft. of 90-lb. flat bottom rails
9 mild steel plates 20 ft. x 4 ft. x ½ in.
100 mild steel plates 20 ft. x 2 ft. x ½ in.
6 mild steel plates 20 ft. x 2 ft. x ¼ in.
9 forged or rolled steel plates 30 in. x 30 in. x 6 in.
9 forged or rolled steel plates 24 in. x 24 in. x 6 in.

The issuing authority and address to which bids should be sent is the Director General, Department of Supply and Development, Frere Road, Karachi. The tender No. is VT-5/ICA/369/57949/A/59. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is September 23, 1959. The Board of Trade reference is ESB/19783/59/ICA.

From Victoria:

900 shock absorbers, complete.

The shock absorbers should be capable of damping the vertical oscillations experienced by the bogies fitted to " Harris " suburban trains. The bogies are of the four-wheel equaliser beam type mounted on helical springs. Hydraulic or friction type of shock absorbers will be considered. They should be supplied complete with rubber mounting blocks, to prevent metal to metal contact with the mounting lugs, and are to be fitted between the bogie bolster and the spring plank. The shock absorbers should be of the double pin type with pin diameters of approximately 1 in. The hole in the mounting brackets has a diameter of 1⅛ in. while the brackets are ½ in. thick. The centre distance between the mounting brackets at tare load is 15¼ in. for a trailer car and 14⅞ in. for a motor-car. The vertical movement of the bogie bolster is limited by stops. The maximum movement from the tare load position is 2 in. up and 2¾ in. down in the case of a motor-car, and 1½ in. up and 2¾ in. down for the trailer car.

The issuing authority is the Victorian Railways. The tender No. is 61,558. Bids should be sent to the Secretary for Victorian Railways, Melbourne, C.1. The closing date is September 23, 1959. The Board of Trade reference is ESB/21377/59.

75 electric train stops, complete
12 motor units for train stops.

The Issuing Authority and address to which bids should be sent is the Secretary for Victorian Railways, Melbourne, C.1. The tender No. is 61,545. The closing date was September 9, 1959. The Board of Trade reference is ESB/20552/59.

Further details relating to the above tenders together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

Notes and News

Expenditure on Advertising on British Transport.—Over £3 million was spent in 1958 on advertising on sites of British Transport Advertising, the commercial advertising service of the British Transport Commission. Published figures give the amount spent by 31 major business or product groups on sites on British Railways, London Transport, Provincial and Scottish buses, and delivery vans. Some £400,000 was spent by the manufacturers of alcoholic and other drinks, of which more than half was on London Transport sites.

Proposed Closure of Lockington Station.—The decision recently announced by British Railways, North Eastern Region, that Lockington Station and Kilnwick Gate Siding, on the Hull-Driffield line, were to be closed from September 14, is to be reconsidered. The Transport Users' Consultative Committee for the Yorkshire area at its meeting on September 1 asked for a postponement. For the time being passenger and goods facilities will continue to be available at Lockington Station and freight facilities at Kilnwick Gate Siding.

Late Evening District Line Wimbledon Trains.—To reduce operating costs, three late evening District Line trains from Mansion House to Wimbledon leaving Earls Court at 11.16 p.m., 11.36 p.m. and 12.01 a.m. (Monday/Tuesday to Friday/Saturday nights) will be replaced on September 14 by trains from Kensington High Street, leaving Earls Court for Wimbledon at 11.17 p.m., 11.37 p.m., and 12.08 a.m. respectively. As a result the last through trains on the District Line to Wimbledon will be the 10.38 p.m. from Mansion House (10.56 p.m. at Earls Court). Similar arrangements will apply in the opposite direction.

Distribution of Teddington Protection Equipment in Canada.—Teddington Industrial Equipment Limited announces the appointment of Aviation Electric Limited, of Montreal, as exclusive distributor of Teddington engine protection equipment for the Dominion of Canada. The Aviation Electric Company will deal in protection devices ranging from single pressure and temperature controls to panelised equipment for control and protection of engines, compressors, turbines, and most other forms of rotary and reciprocating machinery, including locomotives and railcars.

N.E. Region Station Gardens Competition.—In this year's competition for the best kept station gardens in British Railways, North Eastern Region, six stations qualified for special class awards, the same number as last year. Beverley gained its fifth successive special class award, Wetheral its fourth, and Riding Mill its fifth. Cottingham, Ferriby, and Goathland are in the special class for the first time. First class awards were given to 26 stations, second class to 40, and third class to 61, and certificates of commendation to 16 stations.

R.C.T.S. Tour of Southern Region London Lines.—The Railway Correspondence & Travel Society special train, hauled by an " H " class 0-4-4 tank engine of the former South Eastern & Chatham Railway, will leave Waterloo at 2.5 p.m. on October 3. The itinerary will include: Clapham Junction, East Putney, Wimbledon, Tooting Goods, Tulse Hill, Old Kent Road Junction, Deptford Wharf, New Cross Gate, Peckham Rye, London Bridge, Bricklayers Arms, Blackheath and Angerstein Wharf. The return will be to Cannon Street, due 7.2 p.m. The fare is 13s. 6d. Tickets are obtainable from Mr. J. Miller, 65, Collington Crescent, New Malden, Surrey.

East Kilbride Trains Diverted to St. Enoch Station.—British Railways, Scottish Region, Glasgow—East Kilbride passenger train services now leave from and arrive at St. Enoch Station instead of Central Station. Diesel trains have replaced the former steam trains with the exception of three services in each direction during busy periods of the day. The diversion is necessary to reduce the number of trains leaving and entering Central Station. It will facilitate progress on the re-signalling of Glasgow Central High Level Station, the biggest individual colour-light signalling scheme of its kind on British Railways in Scotland. The completion of this scheme is an essential step in the Glasgow Suburban electrification on the south side of the river.

Improvement of Cargo Accommodation at Queen Alexandra Dock, Cardiff.—A £140,000 improvement scheme for the north side of Queen Alexandra Dock, Cardiff, providing for additional covered accommodation, hard-standing space, and better access, is to be undertaken by British Transport Docks. It is proposed to extend "A" Transit Shed by 170 ft. to give a further 34,000 sq. ft. of covered accommodation. The shed is a single-storey structure at present 600 ft. in length and 200 ft. in width which is used for the temporary accommodation of inward and outward non-refrigerated cargoes discharged from or loaded into overseas vessels berthed alongside. Improvements will also be made in the road and rail access to the berth and hard-standing will be provided for cargo requiring temporary accommodation in the open.

Eastern Region Winter Passenger Timetable.—The main differences in British Railways, Eastern Region, train services from September 14 to November 1 inclusive compared with the current timetable include the discontinuance of the " Elizabethan," which runs non-stop between Kings Cross and Edinburgh. The " Master Cutler " Pullman service between Kings Cross and Sheffield will not run on Saturdays. Services on Saturdays between Liverpool Street and East Anglian holiday resorts will be reduced generally to their winter level. Seasonal weekend cross-country trains between Mid-

land and Yorkshire towns and East Anglian and other resorts will in the main be withdrawn. Engineering work on the East Coast main line will necessitate alteration and cancellation of some services, especially on Sundays. Electrification work between Chelmsford and Colchester will cause minor delays but allowance for this will be made in the winter timetable. As already announced, publication of the timetable has been delayed by the printing dispute and the start of the winter services has been postponed to November 2.

Grimsby & Immingham Tramway to Continue.—The Eastern Area Board of the British Transport Commission recently announced its acceptance of the recommendation of the East Midlands Transport Users' Consultative Committee that the Grimsby & Immingham Electric Tramway should not be closed for two or three years. The tramway is to be maintained for the time being, possibly with a reduced service, limited in the main to peak periods in the morning and evening at Grimsby and Immingham respectively, and to the lesser midday peak. Arrangements are to be made to raise the tram fares into line with bus fares where applicable, thus providing British Railways with increased revenue for possibly reduced services and costs.

Eastern Region Publicity.—British Railways, Eastern Region, has produced the three double royal posters reproduced in the accompanying illustration. In that shown on the left F. Donald Blake makes use of an old Great Northern Railway poster in miniature to contrast the rail facilities between London and Edinburgh of 50 years ago with those of today. Reproduction in five colours by photolithography was by Stafford & Co. Ltd., of Netherfield, Notts. The " Master Cutler " poster is designed to catch the eye of the business man, featuring his accessories: umbrella, briefcase, and Homburg hat. It illustrates the potentialities of the diesel-worked Pullman service between Sheffield and Kings Cross. A timetable and other information on the service is included. The design is by Maynard Studios. Printing by photolithography in eight colours was by Jordison & Co. Ltd., of Middlesbrough. The poster showing the progress of electrification on the London Tilbury & Southend Line was reproduced by silk screen process and one-colour photolithography by Jordison & Co. Ltd. The physical progress achieved so far is shown by a simple percentage diagram. The poster will be brought up to date and re-issued at suitable intervals.

Sixth European Machine Tool Exhibition.—The sixth European Machine Tool Exhibition opens in Paris tomorrow and continues until September 21. George Cohen Sons & Co. Ltd., a company of the 600 Group, are sole agents in the United Kingdom for many well-known machine tools of Continental manufacture which are being shown. The Selson Machine Tool Co. Ltd., also of the 600 Group, are sole selling agents in the U.K. for a number of the makers who will be exhibiting.

Precise Power Tools to be Exhibited in Paris.—At the Sixth European Machine Tool Exhibition in Paris on September 12-21, Precise Products Corporation, U.S.A., and Precise G.m.b.H., Germany, will show a complete range of Precise power quills and grinder-millers which have a speed range up to 45,000 r.p.m., with power ratings between 1/5th h.p. and 1½ h.p. These are precision spindles for hand and mounted applications on machine tools. Included will be the new four-speed, and also the new continuously variable high-frequency converters. and the Precise Vapor Lub system. The sole distributor in Great Britain is Newage Machine Tools Limited (formerly Lorant & Co. Ltd.), 98-100, Croydon Road, London, S.E.20, which can offer from stock most of the items exhibited.

Reconstruction of Huskisson Goods Depot, Liverpool.—Work has started on the construction of a new forwarded goods shed and office block with amenities for all staff at Huskisson Goods Depot, Liverpool, British Railways, London Midland Region. The new shed will be used as a concentration point for the traffic now handled at both Huskisson and Great Howard Street. When the shed is completed it will be possible to load traffic direct from road to rail vehicle. There will be accommodation for 106 wagons. The office and amenities block will be a three-storey building with a single storey block linked to it, and will include a lecture room, mess room, cafeteria, kitchen, drying room, first aid room, women's rest room, and toilets. Total cost of the work is some £250,000 and it is expected that it will be completed by the end of the year. Alterations will also be made to the layout of the sidings in the yard and the traffic exchange facilities between the depot. The Mersey Docks & Harbour Board lines will be improved.

Rouble as Basis for International Goods Rates Beyond Iron Curtain.—The Chairman of the Railway Transport Committee of the Organisation of Railway Co-operation, the international organisation of railways in the Communist countries of Eastern and Central Europe, Mr. Henryk Dronkiewicz, has announced that to simplify consignments of goods by rail between these countries, the rouble is to be used as the basis for charging.

Churchill Surface Grinder Film. — The Churchill Machine Tool Co. Ltd has completed a 16-mm. sound colour film " Precision Plus Production," featuring the Model NB Horizontal-Spindle Surface Grinding Machine. The screening time is 22 min. The unique construction of the machine is shown in close detail and many examples of the work which can be accommodated are featured including form grinding. Copies are held by Sound Services Limited, Wilton Crescent, Merton Park, London, S.W.19. from which they may be obtained on free loan.

Reduced Earnings by Ruston & Hornsby Limited.—There was a fall of £594,200 compared with the previous year in the earnings before tax of Ruston & Hornsby Limited for the year ended March 31, 1959. The drop in Group net profit was £187,809. An ordinary dividend of 8 per cent is to be paid. Mr. J. W. Ruston, Chairman of the company, has stated that while output has been at a slightly lower level than in 1957-58, the fall in earnings is more than proportionate, due to the continuing upward trend in costs, including wages. The number of orders has shrunk further. A slight decline in the total value of exports was more than accounted for by a fall in exports of locomotives and gas turbines. The reduction in demand for larger locomotives was due

Three posters produced by the Department of the Public Relations & Publicity Officer, British Railways, Eastern Region

mainly to political causes, and partly to a drop in the requirements of mining undertakings and to hesitation on the part of British steel companies to order locomotives, because of the threat of nationalisation. The new designs of diesel locomotives now on the market include systems of transmission with torque converters and hydrostatic drive. The Group now has four distinct ranges of air-cooled engines in production, covering a power range of 4 b.h.p. to 460 b.h.p. These have been well received by users and in many cases a marked change in demand from water-cooled to air-cooled engines is noticeable. Further development work in the air-cooled engine field was initiated during the year. Orders received by Davey, Paxman & Co. Ltd., included YHX engines for British Railways line service locomotives and larger YL engines for British Railways cross-Channel vehicle ferries.

J. W. Pickavant & Co. Ltd. Tools at Motor Show.—Among a selection of tools to be displayed by J. W. Pickavant & Co. Ltd. at the International Motor Show, Earls Court, London, on October 21-31, will be several of new or improved design. These include a nut starter to aid assembly work where space and movement are restricted, an Eva-Smooth tape file with a selection of tape rolls for smoothing steel and wood surfaces and so on, and a bush remover consisting of two drifts and 14 double-ended adaptors for bushes of ½-1⅛ in. outside dia.

Powell Duffryn Final Ordinary Dividend.—The Board of Powell Duffryn Limited recommends a final dividend of 10 per cent. actual, less tax, on the 9,660,471 ordinary shares of 10s. each in respect of the year ended March 31, 1959. This with the interim dividend of 6 per cent. actual paid on February 25, 1959, makes 16 per cent. for the year. Consolidated trading profits, including income from investments and interest after deducting interest on debenture stock, and so on, amounted to £1,720,230, against £2,032,709 for the previous year. The annual general meeting will be held on September 16.

Expandite Limited Dividend Maintained.—A final dividend of 10 per cent less tax, which with the intermin dividend paid in December, 1958, makes 15 per cent for the year, March 28, 1959, is proposed by the board of Expandite Limited. The Chairman, Mr. B. Watson, in his review, mentions the increase in home sales of Seelastik, Mulseal, and other products, and the expansion of the firm's activities in the civil engineering and building industries. The value of the company's direct exports is now about seven times the 1953 figure. The progress and prospects of the subsidiary companies in Britain and in the British Commonwealth overseas are stated to be good. Plans are advanced to set up Expandite (Rhodesia) (Pte.) Limited to cover the Central African Federation.

Viewing Access to Engineering Works for Passengers at Manchester London Road Station.—To keep passengers in touch with the progress of work at Manchester London Road Station four special "peepholes" are being provided in the temporary bridge structure between the station and adjoining Mayfield Station. The two windows at the right-hand side from London Road Station will enable the public to watch the construction work on Fairfield Street bridge, while points on the other side will provide viewing access to the new signal-box and general permanent way re-modelling of the station approaches. The temporary footbridge has been constructed to give clearance for the installation of overhead wires. A new permanent footbridge will be constructed, at a later date, connecting platforms Nos. 1-14 of the new station; there will then be no connection with Mayfield Station, as this termini will be used solely for parcels traffic.

English Electric Co. Ltd. Bristol Office.—The address of the Bristol branch office of the English Electric Co. Ltd. is now Equity & Law Building, 36-38, Baldwin Street, Bristol, 1. The telephone number remains the same, Bristol 27304.

International Congress on Metallic Corrosion.—The First International Congress on Metallic Corrosion will be held in South Kensington, London, April 10-15, 1961, under the Presidency of Sir Harry Melville. Mr. E. Leslie Streatfield has been appointed Chairman of the Executive Committee and Dr. J. Ferguson, Chairman of the Finance Committee. Hon. Secretary is Lt.-Colonel Francis J. Griffin, whose address is 14, Belgrave Square, London, S.W.1.

Proposed Closure of Line Between Cookstown Junction and Kilrea, U.T.A.—The Ulster Transport Authority propose closing the line between Cookstown Junction, near Randalstown, and Kilrea, because the section of track is uneconomic to operate. Because passenger traffic on the line was terminated in 1950, the Authority's latest proposal will result in the complete closure of seven railway stations in south-west Antrim and south Derry. The stations affected will be Randalstown, Toomebridge, Castledawson, Magherafelt, Maghera, Upperlands and Kilrea.

Small & Parkes Limited New Coventry Depot.—A new depot building has been designed by Small & Parkes Limited, Hendham Vale Works, Manchester, 9, to give efficient service in Coventry for its Don automotive and industrial brake linings and clutch facings. The address is 8, Lamb Street, Coventry; tel: Coventry 64914. A speciality is the full service offered for genuine Girling and Lockheed replacement brake shoes, and Borg & Beck clutch discs, clutch cover assemblies, and release bearings. The comprehensive stock includes also Donvee fan and dynamo belts, Railite radiator hose, Karmal packings, and Fepco jointings.

Chef Training at B.T.C. School of Transport, Windsor.—A development in industrial training at the British Transport Commission's School of Transport at New Lodge, Windsor, provides training for apprentice cooks and waiters of the British Transport Hotels & Catering Services. The apprentices, under skilled instruction, undertake the whole of the catering in the school. The architect, Mr. A. J. Norcliffe, paid particular attention in the conversion of the building to the provision of an all-electric kitchen. The kitchen, for which Staines Kitchen Equipment Co. Ltd. were main contractors, has electrical catering equipment by General Electric Co. Ltd., including double- and single-oven ranges; a double-pan fryer; a pastry oven; two grills; steaming oven and stockpot.

Bintex Limited Factory Extension.—Bintex Limited has recently opened an extension of nearly 28,000 sq. ft. to its foam cushioning factory at Pannal, near Harrogate. Work was begun last year and the plant is now in full production. It is largely mechanised and a system of planned maintenance is operated. Conveyors bring most of the raw materials to the Mixing Department, and move the cured products from the dryers through the various finish stages, to the loading dock. The loading dock allows the largest road vehicle to be loaded within the building, direct from the finishing conveyor. This arrangement speeds dispatch of products and protects them from deterioration encountered when loading through an open door, an important consideration when dealing with latex foam. Special emphasis has been placed on maintaining a high standard of cleanliness, and quality control is exercised from raw material to finished product.

Liverpool—Hull Service by Multiple-Unit Diesel Trains.—As recorded briefly in the Contracts and Tenders section of our June 26—August 14 issue, British United Traction Limited has received an order for 34 230-h.p. power equipments for diesel multiple-unit vehicles to be built at Swindon for Hull—Liverpool inter-city services. Thirty-four twin-engined power cars and 17 non-driving trailer cars will be operated as eight six-car multiple-unit sets, leaving one spare three-car set. No date has been settled for starting the new diesel service.

Altered Goods and Parcels Arrangements in Scotland.—The Transport User's Consultative Committee for Scotland has approved alterations made by British Railways, Scottish Region, in goods and parcels facilities at Cumnock (Ayrshire), Lumphinnans Farm Siding (Fife), Kirkbank (Roxburghshire), Kirkgunzeon (Kirkcudbrightshire), Letham Grange (Angus), Colinton (Edinburgh), and (in Midlothian) Balerno, Gilmerton, Glencourse, Roslin, and Rosslyn Castel. Cumnock, Lumphinnans Siding, Kirkgunzeon, Letham Grange, Gilmerton, Glencourse, Roslin and Rosslyn Castel have been, or are to be, closed. Kirkbank, Colinton, and Balerno have been converted to unstaffed public sidings for wagonload traffic. Alternative arrangements for dealing with traffic have been made in each case.

Increasing Use of Collico Packing-Case Hire Service.—About 350 traders are regularly making use of the packing-case hire service introduced by British Railways in co-operation with Collico Limited of Barking. The latest figures show 11,250 cases to be on hire. The service provides collapsible cases on a monthly hire basis. Traders are relieved of the need to provide and maintain their own cases. The hiring charge covers the cost of rail carriage on both loaded and empty journeys, and senders pay rail charges on only the weight of the contents. The metal containers have a capacity of 2 cwt. are completely collapsible, with no loose parts. The users' own advertisements are carried on the cases if desired. Traders dealing in engineering products, food, clothing, radio, motorcar and cycle spares, chemical, and medical goods, are reported to have made particular use of the cases.

Forthcoming Meetings

September 14 (*Mon.*).—Institute of Transport, in the Jarvis Hall, 66, Portland Place, W.1, at 5.45 p.m. The 1959 Brancker Memorial Lecture.

September 15 (*Tue.*).—The Railway Correspondence & Travel Society, Birmingham & West Midland Branch, at the Engineering Centre, New Street, Birmingham, at 7.15 p.m. Paper on "Some notable speed records and test runs," by Mr. John Clay.

September 16 (*Wed.*).—The Railway Correspondence & Travel Society, West Riding Branch, at the British Railways Social Club, Aire Street, Leeds, 1, at 7.30 p.m. Paper on "The New Leeds City Station project," by Mr. W. E. Waite, District Operating Superintendent, Leeds.

September 22 (*Tues.*).—Institution of Locomotive Engineers, at the Federation of British Industries, 21, Tothill Street,

Westminster, at 5.30 p.m. Presidential Address by Mr. R. A. Smeddle.

September 23 (*Wed.*).—The Railway Correspondence & Travel Society, South of England Branch, at the Junction Hotel, Eastleigh, at 6.30 p.m. Paper on "The Modified Bulleid Pacifics," by Mr. R. G. Jarvis.

September 24 (*Thur.*).—The Model Railway Club, at Caxton Hall, Westminster, S.W.1, at 7.45 p.m. A film, including "Night Mail" from Euston.

September 25 (*Fri.*).—The Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, London, N.W.1, at 7.15 p.m. Paper on "The North London Railway," illustrated by lantern slides.

September 26 (*Sat.*).—The Railway Correspondence & Travel Society, Bristol and South Gloucestershire rail tour.

September 26 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Ipswich, at 2.15 p.m. Paper on "Work of the B.T.C. mining service," illustrated by lantern slides, by Mr. M. Fletcher.

Railway Stock Market

There was a general tendency earlier in the week to await official news of the date of the election. Stock markets reacted sharply, due mainly to caution by buyers, though there was a fair amount of profit-taking after the big rise in share values of the past few weeks. The set-back on Wall Street also affected sentiment, but it is believed that British stock markets will rally because of the confidence in the City in prospects of a Conservative election victory. British Funds have again declined after renewed talk of the possibility of a higher bank rate, now money rates in the U.S.A. are continuing to rise.

Canadian Pacifics, reflecting Wall Street, have not recovered from the decline to $50 recorded a week ago. The 4 per cent preference stock kept at 57½ and 4 per cent debentures were little changed at 64½. White Pass shares were $14, compared with $14⅛ a week ago.

Nyasaland Railways shares kept at 10s. 6d. but the 3½ per cent debentures eased slightly to 57½. West of India Portuguese capital stock was again quoted at 106½ and Barsi at 29½.

Costa Rica ordinary stock held firm at 16 on attention drawn to the potentialities of the stock; the first debentures were again 75½ and the second debentures changed hands at 85. Elsewhere, International of Central America common stock eased from $21 to $19½, but the preferred stock was again quoted at $107½.

Antofagasta ordinary stock has come back from 15½ to 13½, and the preference from 25 to 23. The 5 per cent (Bolivia) debentures were again 90½. United of Havana second income stock at 6 was the same as a week ago. Brazil Railway bonds remained at 5¾, and San Paulo Railway 3s. units were again 1s. 6d. Mexican Central "A" bearer debentures at 59½ were also the same as a week ago. Paraguay Central prior debentures receded from 23½ to 22.

North British Locomotive shares fell to 12s. 3d. compared with 13s. 6d. a week ago, after news of the decision not to pay the preference dividends. The 5 per cent preference are quoted at 10s. 4½d. and the 5 per cent "A" preference at 8s. 4½d. Preference dividends are in arrear since 1955, and the present decision caused no surprise, as the directors have made clear that recovery in earnings will be a gradual process. Birmingham Wagon shares were 27s. 6d. compared with 26s. 9d. a week ago. Wagon Repairs 5s. shares have rallied to 10s. 3d., though Gloucester Wagon 10s. shares eased from 18s. 6d. to 18s. At 12s. Charles Roberts 5s. shares compared with 12s. 6d. a week ago. G. D. Peters were quoted at 20s. 7½d. Westinghouse Brake did not keep best prices but at 46s. 9d. compared with 45s. 9d. a week ago. Beyer Peacock 5s. shares eased from 8s. 1½d. to 7s. 10½d.

Despite the reaction in stock markets, T. W. Ward at 101s. held most of their recent rise, but Guest Keen fell sharply to 66s. 6d. and Tube Investments to 88s. 9d. Stone Platt have been steady at 51s. 9d. Elsewhere Babcock & Wilcox came back further from 51s. 9d. to 49s. 6d. Clarke Chapman remained at 54s. Vickers, however, lost 1s. at 31s. At 29s. 7½d. Pollard Bearing 4s. shares have been well maintained, and Ransomes & Marles 5s. shares at 21s. were virtually the same as a week ago. Despite an easier tendency in machine tool shares, Alfred Herbert at 46s. 9d. held up well. Elsewhere, Davy-United were 72s. xd. and Worthington Simpson 10s. shares 43s.

Associated Electrical at 61s. were the same as a week ago, and English Electric 43s., compared with 45s. 3d. General Electric at 38s. were helped by the big success of the loan stock issue.

OFFICIAL NOTICES

RAILWAY SURVEYOR/DRAUGHTSMAN required by Railway Siding Constructional Engineers.

Applicants must have trained in Railway Draughtsmanship, be able to survey existing trackwork, plot same to working scale and be fully conversant with theodolite and level practice.

Men (not over 30 years of age) with knowledge of Railway Standard Specification layouts preferred and only those who have specialised in the survey and design of railway trackwork in the United Kingdom need apply.

Conditions of employment include provision of car, all travelling and general expenses, five-day week on rota system, comprehensive superannuation scheme, etc. Assistance given with housing.

Write in first instance, stating age, experience and salary required to: Sidings Construction Department Manager, Thos. W. Ward Ltd., Albion Works, Sheffield 4.

THE REPUBLIC OF THE SUDAN

APPLICATIONS are invited from those suitably qualified to fill a vacancy as Resident Electrical Engineer (Diesel) in the Sudan Railways.

Candidates must be fully qualified Electrical and Diesel Engineers and in possession of an A.M.I.E.E. or equivalent qualifications. Candidates must have served a recognised apprenticeship in a railway company and have had extensive experience in the repair, maintenance and operation of Main Line Diesel Electric Locomotives, together with sound experience in motive power organisation in diesel electric locomotive running. Candidates must be fully conversant in diesel engineering and capable of controlling staff and labour. They must be fully literate in Arabic or English.

Age, 30-50 years.

Appointment will be on contract for a period of three years (with bonus) in the salary range £S.1,075—£S.1,675. (£S.1 = £E.1 0s. 6d.). Starting rate will be fixed according to age, qualifications and experience. A cost of living allowance is payable which is reviewed every two months and an initial outfit grant of £S.50 on appointment. Annual home leave accrues at the rate of 7 days per month with free air passage. Write for further particulars and application forms to The Personnel Section, Sudan Embassy, Cleveland Row, St. James's, London, S.W.1, stating age, qualifications and experience, with two recent testimonials, and quoting reference 4/1926. Closing date, September 30, 1959.

GHANA PUBLIC SERVICE COMMISSION

APPLICATIONS are invited for the following vacancies in the GHANA RAILWAY:

DIESEL-ELECTRIC ENGINEER: Responsible for the running and workshop maintenance and repairs to diesel-electric engines. 1. Candidates must (i) hold a B.Sc.(Eng.) or other recognised engineering degree and must have gained two years' practical post-graduate experience; or (ii) must have passed Parts I and II of the examinations of either the Institution of Mechanical Engineers or the Institution of Electrical Engineers and must have been elected to Corporate Membership of the relevant Institution. 2. In addition have gained not less than five years' regular experience in workshop maintenance and repairs to diesel electric engines after qualifying in the terms of (i) or (ii) in paragraph 1 above. 3. Must have attained their 28th birthday. Salary scale, £1,660-£2,080 p.a.

CONSTRUCTION ENGINEER: To undertake railway construction work and remodelling of stations. (*a*) Must hold recognised engineering degree and have gained not less than two years' practical post-graduate experience, or (*b*) not less than 23 years of age must have passed Parts I and II of the examinations of the Institution of Civil Engineers. Candidates must also be experienced in location and construction work, erection of steelwork for both bridges and buildings, and also concrete works, such as buildings, bridges and culvert ; Salary scale, £1,080-£2,080 p.a.

PERMANENT WAY INSPECTOR: Maintenance of track and its alignments; clearance of obstruction; maintenance of points and crossings; correct placement of fouling bars, etc. Also supervision and instruction of men under his charge and the submission of reports, etc., affecting his work and the men under his control.

Candidate must have been engaged on trackwork for at least seven years and have had experience in gangs engaged on relaying the main line and on yard work. Able to lay down points and crossings, etc., and have thorough knowledge of a Permanent Way Inspector's duties. Should be between 25-45 years. Salary scale, £1,040-£1,280 p.a.

Appointments on contract/gratuity terms for one tour of 15-18 months in the first instance. Gratuity at rate of £12 10s. for each completed month of service. Free passages for officer, wife and up to three children under 18 years, and in addition, an education allowance for children when not resident in Ghana of £100 a child for up to three children under 18 years. Outfit allowance, £60/£30. Accommodation at low rental. Interest-free advance for car and car maintenance allowance. Generous home leave on full pay. Income tax at low local rates. Preservation of superannuation or pension rights, where applicable, may be arranged.

For further particulars and application forms, write, stating age, qualifications and experience to THE DIRECTOR OF RECRUITMENT, GHANA HIGH COMMISSIONER'S OFFICE, 13, BELGRAVE SQUARE, LONDON, S.W.1.

CHIEF DRAUGHTSMAN

required for Company engaged in the design and manufacture of Steam and Diesel Shunting Locomotives and General Engineering Work which includes Colliery Winding Engine Equipment. Applicants must have H.N.C. or equivalent and be capable of taking full charge of the Drawing Office. They should have the ability to organise and must possess drive and initiative. Preference will be given to applicants with experience of Locomotive Engineering. The position offers excellent prospects to the right man. Pension Scheme. Five day week. Write, giving details of experience, age and indication of salary expected, to The Director & General Manager, Andrew Barclay, Sons & Co. Ltd., Caledonia Works, Kilmarnock.

BRITISH TRANSPORT COMMISSION

BRITISH Transport Commission invites applications for the following posts:

Research Station, Docks & Waterways, Hayes Road, Southall. Scientific Officer—salary range, £1,045-£1,150.

Post A.—Candidates should have good degree in Physics or Engineering with mathematical ability and knowledge of hydraulics. Practical experience in research or engineering an advantage.

Chief Electrical Engineer's Department, at 14, Melbury Terrace, Marylebone, London, N.W.1.

Senior Scientific Officers—salary according to qualifications and experience subject to a maximum of £1,315.

Good degree and post graduate research experience. Industrial training an advantage. Initially may be required to spend two to three years on research in Universities or industrial firms:

Post B.—Application of modern techniques such as semi-conductors or magnetic amplifiers to electric traction problems. Thorough grounding in electromagnetic theory required.

Post C.—Thermal problems associated with electric equipment. Good knowledge of theory of heat transfer and expertise in all forms of temperature measurement essential.

Technical Assistants—salary range £833-£903.

Post D.—Engineer or Physicist preferably possessing degree or equivalent qualification with some experience in application of modern instrumentation with special emphasis on electronic methods.

Post E.—Engineer qualified for A.M.I.E.E. or A.M.I.M.E. and having experience of conduct of experiments.

Post F.—Technical Assistant—salary range £943-£985.

Engineer with degree or equivalent qualification, experiences in application of modern instrumentation with special emphasis on electronic methods.

Superannuation scheme. Certain travel facilities. Medical examination. Write, quoting post reference and stating age, qualifications and experience to Director of Establishment, British Transport Commission, 222, Marylebone Road, London, N.W.1, within seven days.

THE Proprietors of British Patent No. 726539 are prepared to sell the patent or to license British manufacturers to work thereunder. It relates to "Improvements in or relating to Articulated Railway Trains." Address: BOULT, WADE & TENNANT, 112, Hatton Garden London, E.C.1.